Worldwide Open Proficiency Test for Neutron Activation Analysis Laboratories

PTNAAIAEA17

Determination of Major, Minor and Trace Elements in a Land-plant material and a Siliceous material

CONTENTS

FOREWORD

The IAEA assists its Member States laboratories to continuously improve their analytical performance by producing reference materials, by developing standardized analytical methods, and by conducting inter-laboratory comparisons and proficiency tests. To ensure a reliable worldwide, rapid and consistent response, the IAEA Nuclear Science and Instrumentation Laboratory in Seibersdorf, Austria, coordinates proficiency tests for Member States laboratories.

This summary report presents the results of the worldwide proficiency test for Neutron Activation Analysis Laboratories PTNAAIAEA17 on the determination of Major, Minor and Trace Elements in a Land-plant material and a Siliceous material. Methodologies, statistical analysis, and evaluation of results (for each element and for each laboratory) are also reported. The test was carried out within the IAEA project Research Reactor Utilization, under the Research Reactors Subprogram, Nuclear Science Program. The main objective of the project is to enhance capability of interested Member States in effective utilization of nuclear spectrometry and analytical services in industry, human health, agriculture, and in monitoring and evaluation of the environment.

This proficiency test was designed to identify potential analytical problems, to support IAEA Member States laboratories to improve the quality of their analytical results, to maintain their accreditation and to provide a regular forum for discussion and technology transfer in this topic.

The coordinators of the proficiency test and responsible for this publication were Mr. A. Migliori of the IAEA Nuclear Science and Instrumentation Laboratory, Seibersdorf (Austria) and Mr. N. Pessoa Barradas of the IAEA Physics Section, Department of Nuclear Sciences and Applications (Austria). The IAEA acknowledges the valuable contribution of the international expert Mr. P. Bode (Netherlands).

1. INTRODUCTION

The PTNAAIAEA17 proficiency test was aimed at Neutron Activation Analysis Laboratories involved in environmental studies. The participants were requested to use their established and proven analytical procedures for the determination of concentrations of chemical elements in a Land-plant material and a Siliceous material.

Test materials with established homogeneity and well characterized known target values of the mass fractions of analytes, were distributed to participating laboratories. The laboratories were requested to analyze the samples using established techniques following their analytical procedures. Based on the results of the proficiency test presented in this report, each participating laboratory should assess its analytical performance by using the specified criteria and, if appropriate, to identify discrepancies, and to correct relevant analytical procedures.

The Proficiency Test was announced by Mr. Pessoa Barradas on May 29th, 2019. The test materials were distributed to the participating laboratories in August 2019. The deadline for submission of the results was December 15th, 2019. The proficiency test coordinated by NSIL was implemented exploiting a web based platform (www.pt-nsil.com) to facilitate and improve the processes and actions required for the organization and functionality of the exercise for the participants and the coordinator. Detailed instructions for analysts were available on the website.

The submitted results were processed, grouped versus analytes/laboratories and compared with the analyte's assigned values. The values of *z*- and of *u*-scores were calculated for three fit-for-purpose levels. For the definitions of the *z*- and *u*-scores please see Section 3.2. The obtained results as well as the description of the data evaluation procedures are described in this report. Each laboratory was assigned a code, therefore full anonymity of the presented results is guaranteed. The link between the laboratory code and the laboratory name is known only to the organizers of the proficiency test and to the laboratory itself.

2. DESCRIPTION OF THE TEST SAMPLE

The test materials were a Land-plant material and a Siliceous material prepared and tested by an external independent laboratory. The powdered, homogenized, and dried materials were distributed to 50 laboratories in sealed plastic phials, each phial containing minimum 2 g of the test samples. The participants were asked to conduct the determination of the mass fractions of chemical elements in the samples according to their routine analytical procedures. They were also instructed to determine the moisture content of the material by using a separate sample and to report the results on a dry-weight basis. Only one result per element per analytical technique should be submitted. Each result should be accompanied by an estimate of its uncertainty expressed as one standard deviation. No restriction on the number of the reported elements was imposed.

3. DETAILS OF THE EXERCISE

3.1. ASSIGNED VALUE AND TARGET STANDARD DEVIATION

Assigned values X_A were defined in two steps. For a first evaluation, the reference values supplied by the provider of the materials, established by independent inter-laboratory survey, were used as assigned values. This first evaluation was based on 13 certified values and 8

information values for the Land-plant material and on 26 certified values and on 14 information values for the Siliceous material.
After receiving the results from all participants, an evaluation of their density distribution was made. For those elements without well characterized values from the producer (including all element for which the information values were known) but having more than 5 reported valid results and exhibiting a normal distribution (Figs. 4-26 and 80-114 for the Land-plant material and for the Siliceous material, respectively), the median values were used as assigned values for a second evaluation. These values are presented in Tables 2a and 2b in italic character. The *z*- and *u*-scores for elements with information value and for which there were not more than 5 reported valid results, were not used for the determination of the overall performance of the laboratory. However, in order to allow an evaluation of results also for these elements, the information values are reported in Tables 2a and 2b in italic character and marked with "*".
The participants of this proficiency test submitted results for 38 and 53 analytes for the Land-plant material and for the Siliceous material, respectively. The *z*- and *u*-scores were calculated for all the submitted results of all analytes except 12 elements for the Land-plant material and 17 elements for the Siliceous material, for which the assigned values were not available (even after the second evaluation of results).
For each analyte a target value of the standard deviation has been assigned using a modified Horwitz function as proposed in the reference [1]:

$$H_A = \begin{cases} 0.22 X_A & X_A < 1.2 \cdot 10^{-7} \\ 0.02 \left(X_A\right)^{0.8495} & 1.2 \cdot 10^{-7} \le X_A \le 0.138 \\ 0.01 \sqrt{X_A} & X_A > 0.138 \end{cases} \quad (1)$$

In Eqn. (1) the assigned value of analyte, X_A, is expressed as a mass fraction. The target value of the standard deviation, σ_A is related to H_A by a factor *k*:

$$\sigma_A = kH_A, \quad k = 0.5, 1.0, 1.5 \quad (2)$$

Depending on the value of the factor *k* the target value of the standard deviation is recognized as fit-for-purpose at three levels of uncertainty: *k* = 0.5 - appropriate for high precision analysis; *k* = 1.0 - appropriate for well-established routine analysis; *k* = 1.5 - satisfactory for common analytical tasks. The relative value of the target standard deviation, *RSD*, expressed in per cent, is defined as follows:

$$RSD = \frac{\sigma_A}{X_A} \cdot 100\% \quad (3)$$

The relative value of the target standard deviation as a function of the assigned mass fraction of the analyte, X_A, is shown in Fig. 1 for the three different values of the *k* factor.

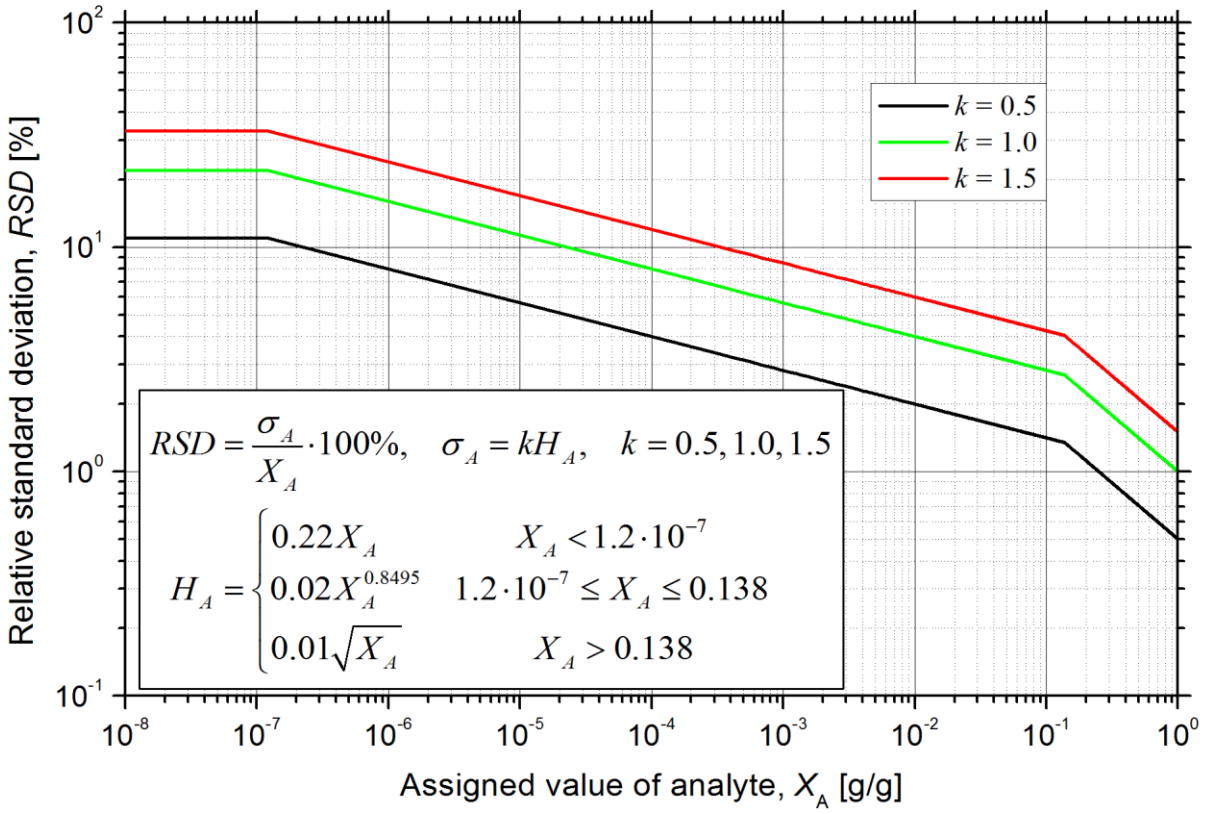

FIG. 1. Relative value of the target standard deviation, RSD, as a function of the assigned mass fraction of the analyte, X_A, calculated by using a modified Horwitz function, Eqn. (1).

3.2. *z*-SCORES AND *u*-SCORES

The reported concentrations of analytes were compared with the assigned values by using the *z*-score analysis. For every result a *z*-score was calculated:

$$z = \frac{x - X_A}{\sigma_A} \tag{4}$$

The term '*x*' denotes the reported mass fraction of analyte. Defined by different fit-for-purpose ranges of the target standard deviation, three different values of *z*-scores were calculated by combining Eqns. (2) and (4). Assuming that appropriate values for X_A and σ_A have been used and that the underlying distribution of analytical errors is normal, apart from outliers, in a well-behaved analytical system *z*-scores would be expected to fall outside the range $-2 \le z \le 2$ in about 4.6% of instances, and outside the range $-3 < z < 3$ only in about 0.3%. Therefore, based on the *z*-scores, the following decision limits were established:

$$\begin{aligned} |z| &\le 2 && \text{- a satisfactory result} \\ 2 < |z| &< 3 && \text{- the result is considered questionable} \\ |z| &\ge 3 && \text{- the result is considered unsatisfactory} \end{aligned} \tag{5}$$

The advice to the laboratory is that, independent of the fit-for-purpose range selected by the laboratory, any *z*-score for an element outside the range $-2 \le z \le 2$ should be examined by the analyst and all steps of the analytical procedure verified to identify the source(s) of the analytical bias.

For every participant the rescaled sum of *z*-scores, *RSZ*, as well as the sum of squared *z*-scores, *SSZ*, were calculated as defined by the following equations:

$$RSZ = \frac{\sum_{i=1}^{L} z_i}{\sqrt{L}} \tag{6}$$

$$SSZ = \sum_{i=1}^{L} (z_i)^2 \tag{7}$$

The symbol '*L*' denotes the number of results provided by the laboratory/participant for all the analytes determined. The summing up in Eqns. (6) and (7) takes into account all *z*-scores for all analytes with known assigned values reported by participant. The *RSZ* can be interpreted as a standardized normally distributed variable, with expected value equal to zero and unit variance. It is sensitive in detecting a small consistent bias in an analytical system, however, it is not sensitive in cases where there are even big errors but having opposite signs. The *SSZ* takes no account of the signs because it depends on the squared *z*-scores. It has a chi-squared (χ^2) distribution with *L* degrees of freedom. The *SSZ* can be regarded as complementary to *RSZ*, which means that if *RSZ* is well within the range $-3 < RSZ < 3$ and if at the same time the value of *SSZ* is above the $\chi^2_{critical}$ value the overall performance of the laboratory requires improvement.

The reported results were accompanied by the standard uncertainty estimate made by the participant. The values were used to calculate the *u*-scores:

$$u = \frac{|x - X_A|}{\sqrt{(\sigma_A)^2 + (\sigma_x)^2}} \tag{8}$$

The symbol 'σ_x' denotes the standard uncertainty of the submitted result *x*. If the assumptions about X_A and σ_A and about the normality of the underlying distributions are correct, and the laboratory estimate of σ_x takes into account all the significant sources of uncertainty, the *u*-scores would have a truncated normal distribution with unit variance. In a well-behaved analytical system only 0.1% of *u*-scores would fall outside the range $u < 3.29$. Therefore, the following decision limits for the *u*-scores were established:

$u \le 1.64$ - reported result does not differ from the assigned value
$1.64 < u \le 1.95$ - reported result probably does not differ from the assigned value
$1.95 < u \le 2.58$ - it is not clear whether the reported and assigned values differ (9)
$2.58 < u \le 3.29$ - reported result is probably different from the assigned value
$3.29 < u$ - reported result differs from the assigned value

The *u*-scores are especially useful for deciding whether the laboratory fit-for-purpose criteria are fulfilled. By comparing Eqn. (4) and Eqn. (8) one can notice that for corresponding values of *u*-score and *z*-score the following inequality is always fulfilled:

$$u \leq |z| \tag{10}$$

It implies that if the *u*-score is larger than 3.29 also the decision limit for the corresponding *z*-score is triggered and the laboratory has to check the analytical procedure as well as review the uncertainty budget estimation. If *u*-score stays below the value of 1.64 and at the same time the *z*-score decision limit is triggered ($|z| > 3$) the laboratory should reevaluate its fit-for-purpose status for that particular analyte.

3.3. CONSENSUS VALUES

To examine the overall performance of the participating laboratories the submitted results have been statistically processed and the consensus values were calculated. The results were tested for the presence of outliers using a set of seven outlier rejection tests, shown below:

Description of symbols:

$x_1 < ... < x_n$	- set of analytical results	
$\bar{x}$	- mean value	(11)
s	- standard deviation	

1. Coefficient of kurtosis [2], number of results: $5 \leq n \leq 100$, two-sided test, confidence level = 0.95:

$$b_2 = \frac{n\sum_{i=1}^{n}(\bar{x} - x_i)^4}{\left[\sum_{i=1}^{n}(\bar{x} - x_i)^2\right]^2} \tag{12}$$

   If b_2 > critical value then reject the result that is at the furthest distance from the mean, decrease *n*, repeat the procedure until $b_2 \leq$ critical value.

2. Coefficient of skewness [2], number of results, $5 \leq n \leq 60$, one-sided test, confidence level = 0.95:

$$\sqrt{b_1} = \frac{\sqrt{n}\sum_{i=1}^{n}(x_i - \bar{x})^3}{\left[\sum_{i=1}^{n}(x_i - \bar{x})^2\right]^{3/2}} \tag{13}$$

   If $\left|\sqrt{b_1}\right|$ > critical value then: if $\sqrt{b_1}$ is positive then reject x_n, otherwise reject x_1, decrease *n*, repeat the procedure until $\left|\sqrt{b_1}\right| \leq$ critical value.

3. Veglia's test [3,4], number of results: $4 \leq n \leq \infty$, two-sided test, confidence level = 0.95:

$$h = \sqrt{\frac{n}{n-1}}\,\frac{|x_k - \bar{x}_{n-1}|}{s_{n-1}} \tag{14}$$

where:

x_k , examined value, the result at the furthest distance from the mean

$\bar{x}_{n-1}$, the mean value of the population of the results with the examined result excluded

s_{n-1}, the standard deviation of the population of the results with the examined result excluded

If h > critical value then reject x_k otherwise temporarily exclude the x_k from the population of results and proceed with testing the next outlier candidate, if the following value of h > critical value then reject both results, decrease n respectively, repeat the procedure until $h \leq$ critical value.

4. Dixon's test [5], number of results: $3 \leq n \leq 25$, two-sided test, confidence level = 0.95:

If x_1 is at the furthest distance from the mean value, then calculate:

$$r = \begin{cases} (x_2 - x_1)/(x_n - x_1), & 3 \leq n \leq 7 \\ (x_2 - x_1)/(x_{n-1} - x_1), & 8 \leq n \leq 10 \\ (x_3 - x_1)/(x_{n-1} - x_1), & 11 \leq n \leq 13 \\ (x_3 - x_1)/(x_{n-2} - x_1), & 14 \leq n \leq 25 \end{cases} \tag{15a}$$

If x_n is at the furthest distance from the mean value then calculate:

$$r = \begin{cases} (x_n - x_{n-1})/(x_n - x_1), & 3 \leq n \leq 7 \\ (x_n - x_{n-1})/(x_n - x_2), & 8 \leq n \leq 10 \\ (x_n - x_{n-2})/(x_n - x_2), & 11 \leq n \leq 13 \\ (x_n - x_{n-2})/(x_n - x_3), & 14 \leq n \leq 25 \end{cases} \tag{15b}$$

If r > critical value then reject the tested result, decrease n, repeat the procedure until $r \leq$ critical value.

5. Outlier rejection test proposed in [2], number of results: $4 \leq n \leq 100$, two-sided test, confidence level = 0.95:

$$w/s = (x_n - x_1)/s \tag{16}$$

If w/s > critical value then: if $x_n - \bar{x} = \bar{x} - x_1$, reject both x_1 and x_n, otherwise reject x_k ($x_k = x_1$ *or* $x_k = x_n$), the result that is at the furthest distance from the mean, for the remaining population of results ($n' = n - 1$) calculate: $T_k = |\bar{x}' - x_k| / s'$, where: $\bar{x}'$ is the mean value and s' is the standard deviation of the population of the results excluding the rejected value x_k, if $T_k >$ critical value then reject also the second

extreme result, decrease n respectively, repeat the procedure until $w/s \leq$ critical value.

6. Outlier rejection test proposed in [6], number of results: $3 \leq n < \infty$, two-sided test, confidence level = 0.95:

$$B_4 = \left| x_k - \bar{x} \right| / s \tag{17}$$

where:

x_k , examined value

If $B_4 >$ critical value then reject the tested result, repeat the procedure until $B_4 \leq$ critical value.

7. Outlier rejection test proposed in [7], number of results: $3 \leq n \leq 100$, two-sided test, confidence level = 0.95:

$$S_k^2 / S = \frac{\sum_{i=1, i \neq k}^{n} (x_i - \bar{x}')^2}{\sum_{i=1, i \neq k}^{n} (x_i - \bar{x})^2}, \quad k = 1 \, or \, k = n \tag{18}$$

where:

x_k , examined value, the result at the furthest distance from the mean

$\bar{x}'$, the mean value of the population of the results with the examined result x_k excluded

If $S_k^2 / S >$ critical value then reject x_k , decrease n, repeat the procedure until $S_k^2 / S \leq$ critical value.

The results which passed the outlier rejection procedures were used to calculate the consensus mean value of analyte, X_C, and corresponding consensus value of its standard deviation, σ_C:

$$X_C = \frac{\sum_{i=1}^{m} x_i}{m} \tag{19}$$

and

$$\sigma_C = \sqrt{\frac{\sum_{i=1}^{m} \left(x_i - X_C \right)^2}{m(m-1)}} \tag{20}$$

The term m denotes the number of reported values for a given analyte excluding the outliers rejected by at least one of the outlier rejections tests. The summing up in Eqn. (19) and (20) takes into account only the results which passed all the outlier rejection tests. The obtained consensus values were compared with the assigned values of the analytes.

4. RESULTS

The test materials were distributed to 50 laboratories for chemical composition analysis. Out of the 50 laboratories, 32 participated in the test submitting 376 individual results for 38 chemical elements for the Land-plant material and 766 individual results for 53 chemical elements for the Siliceous material. All submitted results have been evaluated. The list of the participating laboratories is presented at the end of this report.

The variation of Neutron Activation Analysis technique used by the participants and their codes are listed in Table 1.

TABLE 1. THE CODING, DESCRIPTION AND THE ABBREVIATED NAMES OF THE ANALYTICAL TECHNIQUES USED BY PARTICIPANTS OF THE PROFICIENCY TEST EXERCISE

Technique Code	Description	Abbreviation
5.0	Neutron Activation Analysis	NAA
5.1	K0 Neutron Activation Analysis	K0 NAA
5.2	Neutron Activation Analysis using comparators or reference materials for calibration	CNAA
5.4	Prompt Gamma Ray Activation Analysis	PGAA
10.0	Other analytical technique	OTHER

Tables 2a and 2b show a summary of the assigned analyte values, the target values of standard deviation (obtained by using modified Horwitz function), the consensus values and their standard deviations for the Land-plant material and the Siliceous material, respectively. The elements for which the median values were considered as the assigned values are presented in italic. For 12 (Land-plant material) and 17 (Siliceous material) elements the assigned and target standard deviation values were not available, even after the second evaluation of results; among these elements, Cd and Se for the Land-plant material and Hg and Mo for the Siliceous material are reported for information only in these tables with their information values (in italic character and marked with "*"), since an assigned values could not be determined from the data distributions.
The consensus values (Eqn. 19) and corresponding standard deviations (Eqn. 20) were calculated based on the reported values for elements having more than five results after excluding outliers. The number of reported results and outliers for each sample is listed below:

Sample	Reported values	Outliers
Land-plant material	376	89
Siliceous material	766	66

The correlation between the assigned and the consensus values is shown in Figs. 2 and 3 for the Land-plant material and for the Siliceous material, respectively (information values of Cd and Se for the Land-plant material and of Hg and Mo for the Siliceous material are also reported).

TABLE 2a. THE ASSIGNED VALUES OF ANALYTES, THE TARGET VALUES OF THE STANDARD DEVIATIONS AND THE CONSENSUS VALUES FOR THE LAND-PLANT MATERIAL

Analyte symbol	Assigned value of the analyte, X_A	Target value of standard deviation, σA			Consensus value of the analyte, X_C	Consensus value of the standard deviation, σ_C	Number of results	Number of outliers
		k = 0.5	k = 1.0	k = 1.5				
	[mg/kg]							
Al	*54.55*	*2.39*	*4.78*	*7.17*	*56.15*	*3.24*	*13*	*3*
As	-	-	-	-	0.01	0	7	4
B	-	-	-	-	0.42	0.03	1	0
Ba	9	0.517	1.034	1.551	8.88	0.18	16	2
Br	*0.14*	*0.015*	*0.03*	*0.045*	*0.14*	*0*	*22*	*10*
C	-	-	-	-	410000	28700	1	0
Ca	240	8.414	16.827	25.241	248	3.76	15	1
Cd	*0.002**	*0*	*0*	*0.001*	*0.14*	*0.01*	*1*	*0*
Ce	*0.026*	*0.003*	*0.006*	*0.009*	*0.03*	*0*	*8*	*3*
Cl	600	18.325	36.65	54.974	585	10.25	15	2
Co	*0.008*	*0.001*	*0.002*	*0.003*	*0.01*	*0*	*15*	*7*
Cr	0.11	0.012	0.024	0.036	0.17	0.02	16	6
Cs	*0.006*	*0.001*	*0.001*	*0.002*	*0.01*	*0*	*9*	*1*
Cu	0.59	0.051	0.102	0.153	4	0.02	1	0
Eu	-	-	-	-	0.02	0.03	2	0
Fe	*14.75*	*0.787*	*1.574*	*2.361*	*14.74*	*0.55*	*21*	*5*
Hg	0.06	0.007	0.013	0.02	0.04	0	6	0
K	*30.2*	*1.446*	*2.893*	*4.339*	*30.06*	*0.4*	*17*	*7*
La	*0.017*	*0.002*	*0.004*	*0.006*	*0.02*	*0*	*20*	*8*
Lu	-	-	-	-	0.02	0	1	0
Mg	53	2.332	4.664	6.997	62.71	4.33	11	4
Mn	0.15	0.016	0.032	0.048	0.28	0.06	14	3
Mo	0.034	0.004	0.007	0.011	0.05	0	1	0
Na	56	2.444	4.888	7.332	54.6	2.52	26	2
Nd	-	-	-	-	0.03	0.01	3	1
Rb	*0.106*	*0.012*	*0.023*	*0.035*	*0.11*	*0*	*9*	*1*
Ru	-	-	-	-	0.24	0.01	2	0
Sb	*0.012*	*0.001*	*0.003*	*0.004*	*0.01*	*0*	*16*	*1*
Sc	*0.01*	*0.001*	*0.002*	*0.003*	*0.01*	*0*	*25*	*5*
Se	*0.015**	*0.002*	*0.003*	*0.005*	*5*	*2*	*1*	*0*
Sm	*0.003*	*0*	*0.001*	*0.001*	*0*	*0*	*13*	*2*
Sr	0.65	0.055	0.111	0.166	1.14	0.06	6	2
Th	*0.007*	*0.001*	*0.002*	*0.002*	*0.01*	*0*	*8*	*3*

Analyte symbol	Assigned value of the analyte, X_A	Target value of standard deviation, σA			Consensus value of the analyte, X_C	Consensus value of the standard deviation, σ_C	Number of results	Number of outliers
		k = 0.5	k = 1.0	k = 1.5				
	[mg/kg]							
Ti	-	-	-	-	4264	5879	2	0
U	-	-	-	-	0	0	3	1
V	*0.075*	*0.008*	*0.017*	*0.025*	*0.08*	*0.01*	*10*	*2*
W	-	-	-	-	0.03	0	2	0
Zn	*1.16*	*0.091*	*0.181*	*0.272*	*1.48*	*0.28*	*17*	*3*

TABLE 2b. THE ASSIGNED VALUES OF ANALYTES, THE TARGET VALUES OF THE STANDARD DEVIATIONS AND THE CONSENSUS VALUES FOR THE SILICEOUS MATERIAL

Analyte symbol	Assigned value of the analyte, X_A	Target value of standard deviation, σA			Consensus value of the analyte, X_C	Consensus value of the standard deviation, σ_C	Number of results	Number of outliers
		k = 0.5	k = 1.0	k = 1.5				
				[%]				
Al	5.18	0.081	0.162	0.243	5.2	0.43	17	0
Ca	6.49	0.098	0.196	0.294	7.1	0.08	22	3
Fe	2.63	0.045	0.091	0.136	2.77	0.02	28	1
K	2	0.036	0.072	0.108	2.01	0.03	25	4
Mg	*1.118*	*0.022*	*0.044*	*0.066*	*1.06*	*0.11*	*12*	*0*
Na	2.38	0.042	0.084	0.125	2.46	0.03	30	2
				[mg/kg]				
As	11.56	0.64	1.279	1.919	11.88	0.13	25	1
B	-	-	-	-	92	0.83	1	0
Ba	*1023*	*28.833*	*57.666*	*86.499*	*1013*	*18.51*	*22*	*2*
Br	*207.17*	*7.425*	*14.851*	*22.276*	*206*	*2.71*	*18*	*0*
Ce	61.1	2.632	5.263	7.895	60.83	0.89	24	1
Cl	*20900*	*374*	*748*	*1122*	*20689*	*261*	*13*	*4*
Co	9.2	0.527	1.054	1.581	9.51	0.06	28	6
Cr	74.4	3.111	6.222	9.333	82.03	1.43	28	1
Cs	3.73	0.245	0.489	0.734	3.67	0.03	25	3
Dy	*3.76*	*0.246*	*0.493*	*0.739*	*3.78*	*0.04*	*6*	*1*
Eu	1.079	0.085	0.171	0.256	1.03	0.02	23	2
Ga	-	-	-	-	19.1	3.3	1	0
Gd	-	-	-	-	4.9	0.26	5	2
Hf	*6.2*	*0.377*	*0.754*	*1.13*	*6.1*	*0.08*	*24*	*0*
Hg	*0.132**	*0.014*	*0.029*	*0.043*	*0.76*	*0.09*	*1*	*0*
Ho	-	-	-	-	0.7	0.07	1	0
I	-	-	-	-	123	1.67	5	2
In	-	-	-	-	0.16	0	2	0
La	30.2	1.446	2.893	4.339	30.36	0.39	27	1
Lu	*0.33*	*0.031*	*0.062*	*0.094*	*0.34*	*0.01*	*17*	*0*
Mn	356	11.761	23.523	35.284	373	3.51	21	4
Mo	*4.87**	*0.307*	*0.614*	*0.921*	*5.63*	*0.22*	*5*	*1*
Nb	-	-	-	-	15.2	2.3	1	0
Nd	*26.31*	*1.286*	*2.573*	*3.859*	*26.76*	*0.51*	*16*	*3*
Ni	30.3	1.45	2.901	4.351	30.2	0.14	3	1

Analyte symbol	Assigned value of the analyte, X_A	Target value of standard deviation, σA			Consensus value of the analyte, X_C	Consensus value of the standard deviation, σ_C	Number of results	Number of outliers
		k = 0.5	k = 1.0	k = 1.5				
	[mg/kg]							
Pr	-	-	-	-	5.08	2.44	1	0
Rb	82	3.379	6.758	10.137	89.06	1.46	23	1
Ru	-	-	-	-	22.35	0.21	2	0
S	-	-	-	-	7700	0.02	1	0
Sb	1.34	0.103	0.205	0.308	1.55	0.07	20	0
Sc	*8.39*	*0.487*	*0.974*	*1.462*	*8.36*	*0.07*	*28*	*1*
Se	-	-	-	-	0.8	0.19	4	0
Si	-	-	-	-	249028	7714	3	0
Sm	4.94	0.311	0.621	0.932	4.85	0.07	23	1
Sr	473	14.973	29.945	44.918	495	12.59	17	0
Ta	*0.91*	*0.074*	*0.148*	*0.221*	*0.92*	*0.02*	*19*	*2*
Tb	*0.63*	*0.054*	*0.108*	*0.162*	*0.6*	*0.01*	*16*	*1*
Th	*8.71*	*0.503*	*1.006*	*1.509*	*8.69*	*0.16*	*25*	*0*
Ti	*3530*	*82.572*	*165*	*248*	*3579*	*80.07*	*15*	*1*
Tm	-	-	-	-	0.26	0.06	3	0
U	2.42	0.169	0.339	0.508	2.24	0.07	19	2
V	73	3.061	6.122	9.184	77.95	2	15	3
W	-	-	-	-	1.23	0.13	2	0
Y	-	-	-	-	17.8	3.3	1	0
Yb	*2.14*	*0.153*	*0.305*	*0.458*	*2.21*	*0.07*	*17*	*1*
Zn	140.6	5.342	10.684	16.026	154	2.49	24	5
Zr	*244.5*	*8.548*	*17.095*	*25.643*	*252*	*4.72*	*12*	*3*

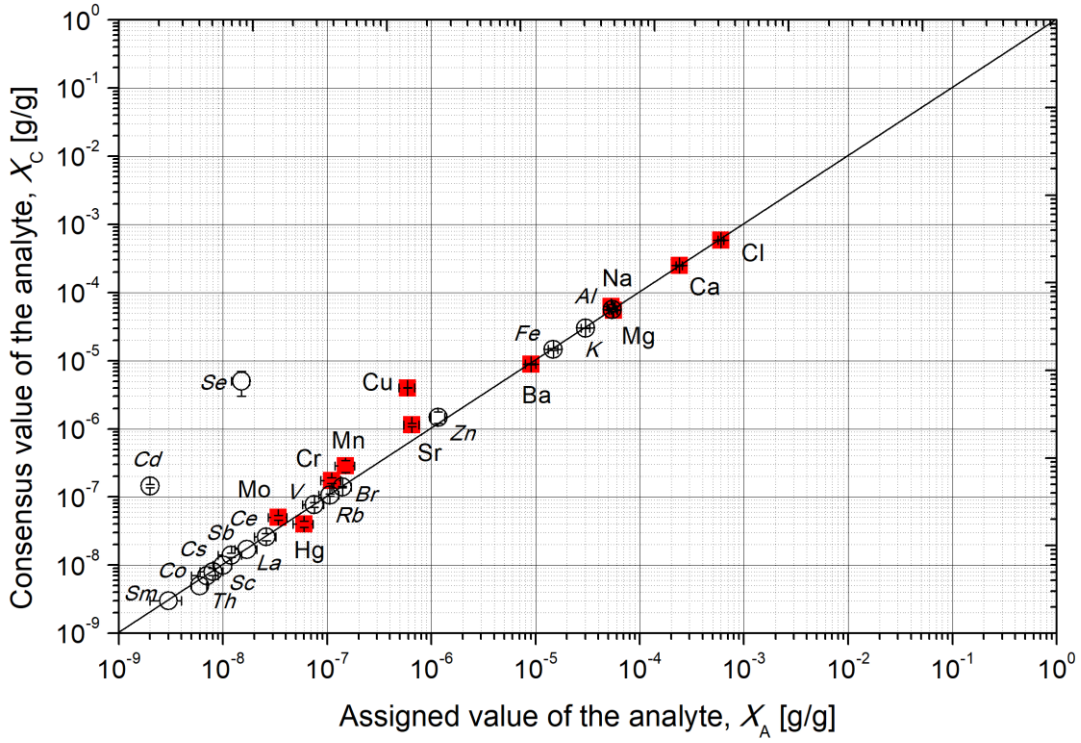

FIG. 2. Correlation between assigned, X_A, and consensus values of analytes, X_C[1] for the Land-plant material.

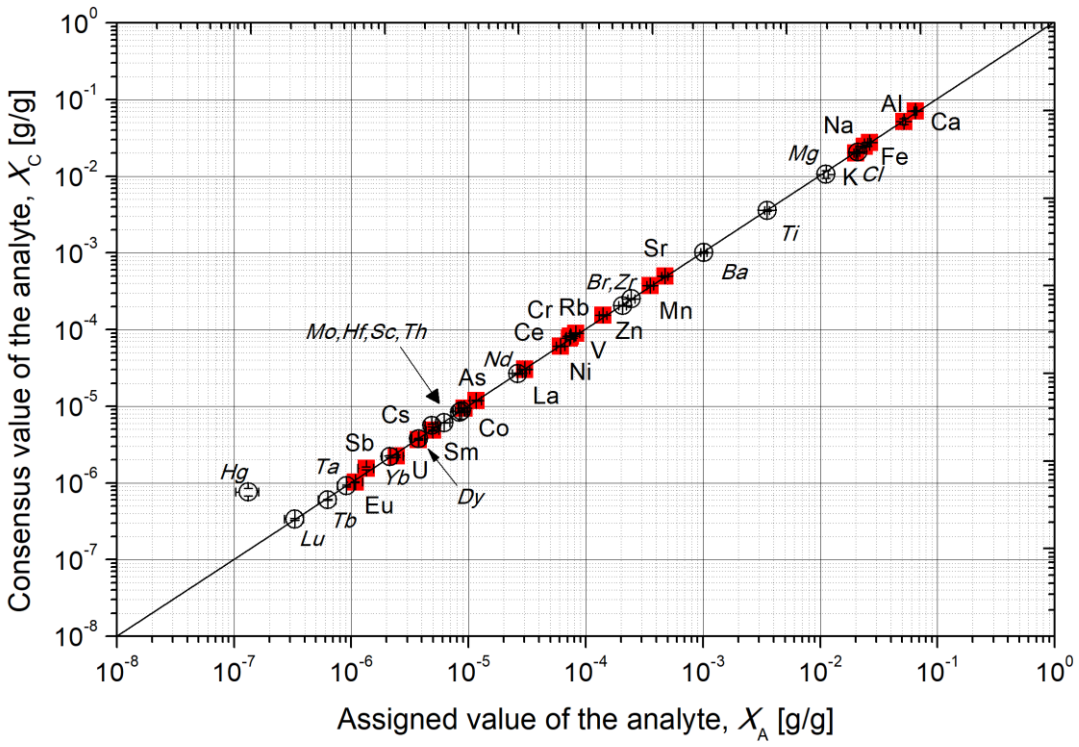

FIG. 3. Correlation between assigned, X_A, and consensus values of analytes, X_C[1] for the Siliceous material.

[1] The uncertainties of the assigned values were calculated according to Eqn. (2) with $k = 1$. The uncertainties of the consensus values were calculated according to Eqn. (20), except for the results reported by a single laboratory, in such a case the laboratory estimate of the uncertainty was shown in the plot. Solid red squares correspond to assigned values taken from the provider of the material. Hollow black circles correspond to the median values of the reported results.

Tables 3a and 3b list the values of the *z*- and *u*-scores for all submitted results for the Land-Plant Material and for the Siliceous Material, respectively. In brackets, next to the element symbol, the assigned values of element concentration and the target standard deviation for k = 1 are shown. The *z*- and *u*-scores were calculated for the three different fit-for-purpose ranges, as defined by Eqn. (2). The results rejected by the outliers rejection procedures were marked with "*" in the "Analyte concentration" column.

Tables 4a and 4b show the combined *z*-scores for the three different fit-for-purpose ranges, the *RSZ* and *SSZ* as defined in Eqns. (6) and (7), for the participating laboratories for the Land-plant material and for the Siliceous material, respectively. The analytes without assigned values were not considered.

Figs. 4-26 and 27-50 present the distributions of the proficiency test results for the Land-plant material. In Figs. 4-26 the individual results are marked with filled circles. The dotted lines show the range of the accepted results (these results were used to calculate the consensus values). The outliers are marked with arrows. Also shown are the estimated parameters of the distribution (after outlier rejection): mode, median, and the mean value. For few elements, the result of density distributions could only be used as indicators of the trends observed in the reported data due to the limited number of results (only density distributions of analytes for which at least 5 results passed the outlier rejection tests are shown). All the populations of results, after outlier rejection, have passed a normality test (Kolmogorov-Smirnov). Figs. 27-50 show the bar chart distributions of the *z*-scores for the analytes with at least 6 submitted results. The results are sorted in ascending order versus laboratory/technique code. The bar charts show the distance between the reported and the assigned values of the analyte. The submitted results and their uncertainties are marked with filled squares accompanied by uncertainty bars. The horizontal lines show the admissible levels of z-score, $|z| < 2$, for three different ranges defined by factor k in Eqn. (2): $k = 0.5$ (solid black lines), $k = 1.0$ (solid green lines) and $k = 1.5$ (solid red lines). For the Siliceous material, the same series of graphs, density distribution functions for the analytes and distributions of *z*-scores for the analytes, are reported in Figs. 80-114 and in Figs. 115-149, respectively.

For every participating laboratory its overall performance for the analysis of the Land-plant material is presented in Figs. 51-79. The plots presented in this figure relate all the *u*-scores and *z*-scores calculated for a given laboratory. The hollow symbols denote the values calculated for specific fit-for-purpose levels as defined in Eqn. (2) with factor k, namely: $k = 0.5$ (black triangles), $k = 1.0$ (green circles), and $k = 1.5$ (red squares). The decision limits of unsatisfactory results were marked with black lines ($|z| > 3$, $u > 3.29$). They divide the plot area in four quadrants. Due to inequality (10) all the points accompanied by a laboratory estimate of the uncertainty fall always below the line $u = |z|$. The smaller the laboratory estimate of the uncertainty the closer the related point to the $u = |z|$ line. Points in the immediate proximity of the dashed diagonal line ($u = |z|$) have underestimated uncertainty values. The well performing laboratories would have more points located in the lower-left quadrant of the plot. If there are many points located in the upper-right quadrant it suggests that these results do not fall in the defined fit-for-purpose targets and that the laboratory provided too "narrow" uncertainty estimate. The same series of graphs for the Siliceous material is presented in Figs. 150-181.

Figs. 182 and 183 show the partitioning of the results among different variations of Neutron Activation Analysis technique used by the participants, for the Land-plant material and for the Siliceous material, respectively.

TABLE 3a. SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE LAND-PLANT MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
Al (54.55 ± 4.780) [mg/kg]										
186	5.1	0.03*	0.004	13.33	-22.81	-11.41	-7.6	22.81	11.41	7.6
152	5.2	41.75	2.69	6.44	-5.36	-2.68	-1.79	3.56	2.33	1.67
222	5.1	46.8	3.5	7.48	-3.24	-1.62	-1.08	1.83	1.31	0.97
172	5.1	47.7	3.4	7.13	-2.87	-1.43	-0.96	1.65	1.17	0.86
224	5	52	1.1	2.12	-1.07	-0.53	-0.36	0.97	0.52	0.35
215	5.1	52.1	1.7	3.26	-1.03	-0.51	-0.34	0.84	0.48	0.33
178	5.1	57	1.9	3.33	1.03	0.51	0.34	0.8	0.48	0.33
176	5	58	1.1	1.9	1.44	0.72	0.48	1.31	0.7	0.48
193	5	63	0.023	0.04	3.54	1.77	1.18	3.54	1.77	1.18
199	5.1	68.56	3.84	5.6	5.86	2.93	1.95	3.1	2.28	1.72
55	5.2	74.56	1.26	1.69	8.37	4.19	2.79	7.41	4.05	2.75
76	5	118.36*	6	5.07	26.7	13.35	8.9	9.88	8.32	6.83
211	5.2	575.604*	102.202	17.76	218.01	109	72.67	5.1	5.09	5.09
As [mg/kg]										
192	5.2	0.006	0.001	16.67	-	-	-	-	-	-
40	5.1	0.006	0.002	33.33	-	-	-	-	-	-
198	5.1	0.007	0.001	14.29	-	-	-	-	-	-
176	5	0.022*	0.002	9.09	-	-	-	-	-	-
224	5	0.031*	0.002	6.45	-	-	-	-	-	-
194	5.1	0.088*	0.008	9.09	-	-	-	-	-	-
184	5	0.1*	0.01	10	-	-	-	-	-	-
B [mg/kg]										
183	5.4	0.42	0.029	6.9	-	-	-	-	-	-
Ba (9 ± 1.034) [mg/kg]										
152	5.2	0.23*	0.04	17.39	-16.96	-8.48	-5.65	16.91	8.47	5.65
169	5.1	7.86	0.32	4.07	-2.2	-1.1	-0.73	1.87	1.05	0.72
61	5.2	7.95	0.69	8.68	-2.03	-1.02	-0.68	1.22	0.84	0.62
199	5.1	8.26	1.81	21.91	-1.43	-0.72	-0.48	0.39	0.35	0.31
183	5.1	8.4	0.25	2.98	-1.16	-0.58	-0.39	1.04	0.56	0.38
224	5	8.5	0.9	10.59	-0.97	-0.48	-0.32	0.48	0.36	0.28
186	5.1	8.638	2.5	28.94	-0.7	-0.35	-0.23	0.14	0.13	0.12
198	5.1	8.71	0.32	3.67	-0.56	-0.28	-0.19	0.48	0.27	0.18
176	5	8.8	1.1	12.5	-0.39	-0.19	-0.13	0.16	0.13	0.11
215	5.1	9.3	0.3	3.23	0.58	0.29	0.19	0.5	0.28	0.19
40	5.1	9.34	0.5	5.35	0.66	0.33	0.22	0.47	0.3	0.21
192	5.2	9.35	0.38	4.06	0.68	0.34	0.23	0.55	0.32	0.22
222	5.1	9.57	2.61	27.27	1.1	0.55	0.37	0.21	0.2	0.19
172	5.1	9.78	3.07	31.39	1.51	0.75	0.5	0.25	0.24	0.23
214	5	9.87	0.167	1.69	1.68	0.84	0.56	1.6	0.83	0.56
213	5	20.5*	1.1	5.37	22.24	11.12	7.41	9.46	7.62	6.05

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE MARINE SEDIMENT TEST MATERIAL.

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
				Br (0.14 ± 0.030) [mg/kg]						
61	5.2	0.127	0.01	7.87	-0.86	-0.43	-0.29	0.72	0.41	0.28
183	5.1	0.13	0.003	2.31	-0.66	-0.33	-0.22	0.65	0.33	0.22
222	5.1	0.13	0.011	8.46	-0.66	-0.33	-0.22	0.54	0.31	0.22
215	5.1	0.132	0.005	3.79	-0.53	-0.27	-0.18	0.5	0.26	0.18
176	5	0.136	0.006	4.41	-0.27	-0.13	-0.09	0.25	0.13	0.09
172	5.1	0.14	0.009	6.43	0	0	0	0	0	0
199	5.1	0.14	0.03	21.43	0	0	0	0	0	0
194	5.1	0.142	0.003	2.11	0.13	0.07	0.04	0.13	0.07	0.04
224	5	0.142	0.006	4.23	0.13	0.07	0.04	0.12	0.07	0.04
192	5.2	0.145	0.005	3.45	0.33	0.17	0.11	0.32	0.16	0.11
213	5	0.154	0.08	51.95	0.93	0.47	0.31	0.17	0.16	0.15
170	5	0.161	0.016	9.94	1.4	0.7	0.47	0.96	0.62	0.44
40	5.1	0.17*	0.01	5.88	1.99	1	0.66	1.66	0.95	0.65
169	5.1	0.189*	0.007	3.7	3.26	1.63	1.09	2.95	1.59	1.07
198	5.1	0.202*	0.011	5.45	4.12	2.06	1.37	3.33	1.93	1.33
55	5.2	0.209*	0.023	11	4.58	2.29	1.53	2.51	1.82	1.36
152	5.2	0.22*	0.01	4.55	5.31	2.66	1.77	4.43	2.52	1.73
178	5.1	0.36*	0.017	4.72	14.61	7.31	4.87	9.69	6.36	4.56
195	5	0.434*	0.08	18.43	19.53	9.77	6.51	3.61	3.44	3.2
184	5	0.5*	0.03	6	23.91	11.96	7.97	10.73	8.47	6.64
193	5	0.5*	0.004	0.8	23.91	11.96	7.97	23.11	11.85	7.94
76	5	9.91*	0.7	7.06	649.02	324.51	216.34	13.95	13.94	13.93
				C [mg/kg]						
183	5.4	410000	28700	7	-	-	-	-	-	-
				Ca (240 ± 16.827) [mg/kg]						
55	5.2	222.17	35.1	15.8	-2.12	-1.06	-0.71	0.49	0.46	0.41
172	5.1	235	15	6.38	-0.59	-0.3	-0.2	0.29	0.22	0.17
61	5.1	236	25	10.59	-0.48	-0.24	-0.16	0.15	0.13	0.11
76	5	236.14	25	10.59	-0.46	-0.23	-0.15	0.15	0.13	0.11
192	5.2	238	10	4.2	-0.24	-0.12	-0.08	0.15	0.1	0.07
222	5.1	238	14	5.88	-0.24	-0.12	-0.08	0.12	0.09	0.07
198	5.1	247	10	4.05	0.83	0.42	0.28	0.54	0.36	0.26
170	5	252	24	9.52	1.43	0.71	0.48	0.47	0.41	0.34
183	5.1	254	10	3.94	1.66	0.83	0.55	1.07	0.72	0.52
224	5	257	10	3.89	2.02	1.01	0.67	1.3	0.87	0.63
176	5	259	10	3.86	2.26	1.13	0.75	1.45	0.97	0.7
215	5.1	261	8	3.07	2.5	1.25	0.83	1.81	1.13	0.79
199	5.1	263	40	15.21	2.73	1.37	0.91	0.56	0.53	0.49
193	5	272.5	0.001	0	3.86	1.93	1.29	3.86	1.93	1.29
178	5.1	307*	27	8.79	7.96	3.98	2.65	2.37	2.11	1.81
				Cd [mg/kg]						
192	5.2	0.144	0.008	5.56	-	-	-	-	-	-

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED z- AND u-SCORES FOR THE LAND-PLANT MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	k = 1.0	k = 1.5	k = 0.5	k = 1.0	k = 1.5
				Ce (0.026 ± 0.006) [mg/kg]						
215	5.1	0.019	0.007	36.84	-2.45	-1.22	-0.82	0.93	0.77	0.63
198	5.1	0.023	0.003	13.04	-1.05	-0.52	-0.35	0.72	0.46	0.33
214	5	0.026	0.001	3.85	0	0	0	0	0	0
192	5.2	0.029	0.002	6.9	1.05	0.52	0.35	0.86	0.5	0.34
40	5.1	0.034	0.004	11.76	2.8	1.4	0.93	1.63	1.15	0.85
184	5	0.05*	0.01	20	8.39	4.2	2.8	2.31	2.08	1.82
152	5.2	0.1*	0.01	10	25.87	12.94	8.62	7.11	6.42	5.62
193	5	0.102*	0.003	2.94	26.57	13.29	8.86	18.34	11.77	8.36
				Cl (600 ± 36.650) [mg/kg]						
152	5.2	350.7*	27.6	7.87	-13.6	-6.8	-4.53	7.53	5.43	4.05
149	10	507.4	13.1	2.58	-5.05	-2.53	-1.68	4.11	2.38	1.64
183	5.4	550	33	6	-2.73	-1.36	-0.91	1.32	1.01	0.78
222	5.1	570	23	4.04	-1.64	-0.82	-0.55	1.02	0.69	0.5
76	5	570.01	32	5.61	-1.64	-0.82	-0.55	0.81	0.62	0.47
172	5.1	575	23	4	-1.36	-0.68	-0.45	0.85	0.58	0.42
193	5	577.18	0.09	0.02	-1.25	-0.62	-0.42	1.25	0.62	0.42
176	5	579	9	1.55	-1.15	-0.57	-0.38	1.03	0.56	0.38
224	5	579	10	1.73	-1.15	-0.57	-0.38	1.01	0.55	0.38
175	5.2	591	44	7.45	-0.49	-0.25	-0.16	0.19	0.16	0.13
199	5.1	605	23	3.8	0.27	0.14	0.09	0.17	0.12	0.08
215	5.1	620	31	5	1.09	0.55	0.36	0.56	0.42	0.32
55	5.2	631.51	11.36	1.8	1.72	0.86	0.57	1.46	0.82	0.56
178	5.1	653	27.5	4.21	2.89	1.45	0.96	1.6	1.16	0.86
213	5	6133.1*	201	3.28	301.95	150.97	100.65	27.41	27.08	26.55
				Co (0.008 ± 0.002) [mg/kg]						
214	5	0.006	0.001	16.67	-2.27	-1.14	-0.76	1.5	0.99	0.71
198	5.1	0.006	0.001	16.67	-2.27	-1.14	-0.76	1.5	0.99	0.71
149	5	0.006	0.001	16.67	-2.27	-1.14	-0.76	1.5	0.99	0.71
40	5.1	0.007	0.001	14.29	-1.14	-0.57	-0.38	0.75	0.49	0.35
215	5.1	0.008	0.001	12.5	0	0	0	0	0	0
61	5.2	0.009	0.002	22.22	1.14	0.57	0.38	0.46	0.38	0.3
192	5.2	0.009	0.001	11.11	1.14	0.57	0.38	0.75	0.49	0.35
184	5	0.01	0.001	10	2.27	1.14	0.76	1.5	0.99	0.71
213	5	0.016*	0.001	6.25	9.09	4.55	3.03	6.01	3.95	2.83
152	5.2	0.02*	0.002	10	13.64	6.82	4.55	5.49	4.5	3.62
183	5.1	0.04*	0.004	10	36.36	18.18	12.12	7.81	7.32	6.68
195	5	0.047*	0.01	21.28	44.32	22.16	14.77	3.88	3.84	3.77
193	5	0.07*	0.001	1.43	70.45	35.23	23.48	46.54	30.63	21.96
186	5.1	0.165*	0.005	3.03	178.41	89.2	59.47	30.92	29.62	27.77
178	5.1	0.45*	0.02	4.44	502.27	251.14	167.42	22.08	22.01	21.91
				Cr (0.11 ± 0.024) [mg/kg]						
152	5.2	0.07	0.01	14.29	-3.31	-1.65	-1.1	2.55	1.53	1.06
61	5.2	0.128	0.011	8.59	1.49	0.74	0.5	1.1	0.68	0.47
214	5	0.132	0.002	1.52	1.82	0.91	0.61	1.79	0.91	0.61
184	5	0.17	0.01	5.88	4.96	2.48	1.65	3.82	2.29	1.59

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE MARINE SEDIMENT TEST MATERIAL.

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	k = 1.0	k = 1.5	k = 0.5	k = 1.0	k = 1.5
199	5.1	0.17	0.05	29.41	4.96	2.48	1.65	1.17	1.08	0.97
222	5.1	0.199	0.088	44.22	7.36	3.68	2.45	1	0.98	0.93
172	5.1	0.202	0.076	37.62	7.6	3.8	2.53	1.2	1.15	1.09
170	5	0.202	0.03	14.85	7.6	3.8	2.53	2.84	2.39	1.95
192	5.2	0.207	0.013	6.28	8.02	4.01	2.67	5.46	3.53	2.52
224	5	0.26	0.04	15.38	12.4	6.2	4.13	3.59	3.21	2.78
211	5.2	0.443*	0.127	28.67	27.52	13.76	9.17	2.61	2.58	2.52
175	5.2	0.48*	0.03	6.25	30.58	15.29	10.19	11.44	9.6	7.86
55	5.2	0.61*	0.03	4.92	41.32	20.66	13.77	15.46	12.97	10.62
203	5	0.74*	0.12	16.22	52.07	26.03	17.36	5.22	5.15	5.03
193	5	1.25*	0.002	0.16	94.21	47.11	31.4	92.95	46.95	31.36
194	5.1	4.84*	0.132	2.73	390.91	195.45	130.3	35.68	35.25	34.55
				Cs (0.006 ± 0.001) [mg/kg]						
152	5.2	0.003	0.001	33.33	-4.55	-2.27	-1.52	2.5	1.81	1.35
203	5	0.004	0.001	25	-3.03	-1.52	-1.01	1.67	1.21	0.9
198	5.1	0.005	0.001	20	-1.52	-0.76	-0.51	0.83	0.6	0.45
215	5.1	0.005	0.001	20	-1.52	-0.76	-0.51	0.83	0.6	0.45
214	5	0.006	0.001	16.67	0	0	0	0	0	0
61	5.1	0.006	0.001	16.67	0	0	0	0	0	0
192	5.2	0.006	0.001	16.67	0	0	0	0	0	0
40	5.1	0.006	0.001	16.67	0	0	0	0	0	0
55	5.2	0.011*	0.002	18.18	7.58	3.79	2.53	2.37	2.09	1.78
				Cu (0.59 ± 0.102) [mg/kg]						
193	5	4	0.015	0.38	66.74	33.37	22.25	64.04	33.02	22.14
				Eu [mg/kg]						
40	5.1	0.001	0.001	100	-	-	-	-	-	-
172	5.1	0.037	0.007	18.92	-	-	-	-	-	-
				Fe (14.75 ± 1.574) [mg/kg]						
172	5.1	9.79	4.1	41.88	-6.3	-3.15	-2.1	1.19	1.13	1.05
222	5.1	11.75	3.95	33.62	-3.81	-1.91	-1.27	0.74	0.71	0.65
224	5	12.5	2	16	-2.86	-1.43	-0.95	1.05	0.88	0.73
199	5.1	13.56	2.45	18.07	-1.51	-0.76	-0.5	0.46	0.41	0.35
149	5	14.29	1.63	11.41	-0.58	-0.29	-0.19	0.25	0.2	0.16
61	5.2	14.5	1.9	13.1	-0.32	-0.16	-0.11	0.12	0.1	0.08
176	5	14.5	2.3	15.86	-0.32	-0.16	-0.11	0.1	0.09	0.08
214	5	14.7	0.467	3.18	-0.06	-0.03	-0.02	0.05	0.03	0.02
183	5.1	14.8	1	6.76	0.06	0.03	0.02	0.04	0.03	0.02
170	5	15.3	2.9	18.95	0.7	0.35	0.23	0.18	0.17	0.15
184	5	15.6	1.6	10.26	1.08	0.54	0.36	0.48	0.38	0.3
152	5.2	15.8	1.2	7.59	1.33	0.67	0.44	0.73	0.53	0.4
40	5.1	16	1	6.25	1.59	0.79	0.53	0.98	0.67	0.49
215	5.1	16	5.1	31.88	1.59	0.79	0.53	0.24	0.23	0.22
192	5.2	18.1	0.6	3.31	4.26	2.13	1.42	3.39	1.99	1.38
186	5.1	18.625	1.64	8.81	4.92	2.46	1.64	2.13	1.7	1.35
55	5.2	23.65*	3.71	15.69	11.31	5.66	3.77	2.35	2.21	2.02
195	5	38.852*	3.7	9.52	30.63	15.32	10.21	6.37	5.99	5.49

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED z- AND u-SCORES FOR THE LAND-PLANT MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	k = 1.0	k = 1.5	k = 0.5	k = 1.0	k = 1.5
203	5	41*	6.63	16.17	33.36	16.68	11.12	3.93	3.85	3.73
178	5.1	45*	9.4	20.89	38.44	19.22	12.81	3.21	3.17	3.12
193	5	45*	0.03	0.07	38.44	19.22	12.81	38.42	19.22	12.81
Hg (0.06 ± 0.013) [mg/kg]										
193	5	0.023	0.001	4.35	-5.61	-2.8	-1.87	5.54	2.8	1.87
61	5.2	0.033	0.007	21.21	-4.09	-2.05	-1.36	2.81	1.81	1.29
183	5.1	0.04	0.004	10	-3.03	-1.52	-1.01	2.59	1.45	0.99
192	5.2	0.043	0.003	6.98	-2.58	-1.29	-0.86	2.34	1.26	0.85
215	5.1	0.049	0.002	4.08	-1.67	-0.83	-0.56	1.6	0.82	0.55
169	5.1	0.052	0.006	11.54	-1.21	-0.61	-0.4	0.9	0.55	0.39
K (30.2 ± 2.893) [mg/kg]										
183	5.1	27.7	1	3.61	-1.73	-0.86	-0.58	1.42	0.82	0.56
222	5.1	28.9	4.6	15.92	-0.9	-0.45	-0.3	0.27	0.24	0.21
224	5	29.2	1.4	4.79	-0.69	-0.35	-0.23	0.5	0.31	0.22
176	5	29.6	1.5	5.07	-0.41	-0.21	-0.14	0.29	0.18	0.13
169	5.1	29.7	1.7	5.72	-0.35	-0.17	-0.12	0.22	0.15	0.11
198	5.1	30.7	1.3	4.23	0.35	0.17	0.12	0.26	0.16	0.11
40	5.1	30.8	7	22.73	0.41	0.21	0.14	0.08	0.08	0.07
172	5.1	30.9	4.7	15.21	0.48	0.24	0.16	0.14	0.13	0.11
215	5.1	31.1	5.4	17.36	0.62	0.31	0.21	0.16	0.15	0.13
192	5.2	32	3.2	10	1.24	0.62	0.41	0.51	0.42	0.33
152	5.2	37.6*	3.2	8.51	5.12	2.56	1.71	2.11	1.72	1.37
55	5.2	39.573*	9.38	23.7	6.48	3.24	2.16	0.99	0.95	0.91
149	5	40.13*	8.22	20.48	6.87	3.43	2.29	1.19	1.14	1.07
186	5.1	42.665*	1.295	3.04	8.62	4.31	2.87	6.42	3.93	2.75
193	5	49.15*	0.05	0.1	13.1	6.55	4.37	13.09	6.55	4.37
76	5	51.93*	4	7.7	15.02	7.51	5.01	5.11	4.4	3.68
170	5	56.4*	5.4	9.57	18.11	9.06	6.04	4.69	4.28	3.78
La (0.017 ± 0.004) [mg/kg]										
172	5.1	0.015	0.002	13.33	-1.07	-0.53	-0.36	0.73	0.47	0.34
194	5.1	0.015	0.005	33.33	-1.07	-0.53	-0.36	0.37	0.32	0.27
198	5.1	0.016	0.001	6.25	-0.53	-0.27	-0.18	0.47	0.26	0.18
169	5.1	0.016	0.001	6.25	-0.53	-0.27	-0.18	0.47	0.26	0.18
214	5	0.016	0.001	6.25	-0.53	-0.27	-0.18	0.47	0.26	0.18
222	5.1	0.016	0.002	12.5	-0.53	-0.27	-0.18	0.37	0.24	0.17
61	5.1	0.017	0.001	5.88	0	0	0	0	0	0
40	5.1	0.018	0.002	11.11	0.53	0.27	0.18	0.37	0.24	0.17
215	5.1	0.018	0.001	5.56	0.53	0.27	0.18	0.47	0.26	0.18
203	5	0.018	0.001	5.56	0.53	0.27	0.18	0.47	0.26	0.18
192	5.2	0.019	0.001	5.26	1.07	0.53	0.36	0.94	0.52	0.35
199	5.1	0.02	0.01	50	1.6	0.8	0.53	0.29	0.28	0.26
170	5	0.024*	0.004	16.67	3.74	1.87	1.25	1.59	1.28	1.02
152	5.2	0.025*	0.002	8	4.28	2.14	1.43	2.92	1.89	1.34
178	5.1	0.029*	0.003	10.34	6.42	3.21	2.14	3.39	2.5	1.89
183	5.1	0.03*	0.001	3.33	6.95	3.48	2.32	6.13	3.36	2.28
55	5.2	0.034*	0.008	23.53	9.09	4.55	3.03	2.07	1.93	1.74
149	5	0.073*	0.04	54.79	29.95	14.97	9.98	1.4	1.39	1.39

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE MARINE SEDIMENT TEST MATERIAL.

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
213	5	0.084*	0.004	4.76	35.83	17.91	11.94	15.17	12.23	9.72
193	5	0.121*	0.023	19.01	55.61	27.81	18.54	4.51	4.46	4.39
					Lu [mg/kg]					
152	5.2	0.015	0.001	6.67	-	-	-	-	-	-
					Mg (53 ± 4.664) [mg/kg]					
224	5	48	8	16.67	-2.14	-1.07	-0.71	0.6	0.54	0.47
172	5.1	56.9	12.6	22.14	1.67	0.84	0.56	0.3	0.29	0.27
215	5.1	57.4	5	8.71	1.89	0.94	0.63	0.8	0.64	0.51
222	5.1	58.9	13.7	23.26	2.53	1.26	0.84	0.42	0.41	0.38
176	5	62	10	16.13	3.86	1.93	1.29	0.88	0.82	0.74
152	5.2	73.8	1.1	1.49	8.92	4.46	2.97	8.07	4.34	2.94
199	5.1	82	26	31.71	12.43	6.22	4.14	1.11	1.1	1.08
193	5	119.6*	0.007	0.01	28.56	14.28	9.52	28.56	14.28	9.52
55	5.2	323.42*	60.2	18.61	115.95	57.97	38.65	4.49	4.48	4.46
211	5.2	861.117*	95.996	11.15	346.5	173.25	115.5	8.42	8.41	8.4
178	5.1	1407*	103	7.32	580.56	290.28	193.52	13.14	13.13	13.12
					Mn (0.15 ± 0.032) [mg/kg]					
178	5.1	0.04	0.005	12.5	-6.89	-3.45	-2.3	6.58	3.4	2.28
224	5	0.145	0.006	4.14	-0.31	-0.16	-0.1	0.29	0.15	0.1
176	5	0.156	0.006	3.85	0.38	0.19	0.13	0.35	0.18	0.12
172	5.1	0.171	0.011	6.43	1.32	0.66	0.44	1.08	0.62	0.43
215	5.1	0.175	0.007	4	1.57	0.78	0.52	1.43	0.76	0.52
170	5	0.192	0.028	14.58	2.63	1.32	0.88	1.3	0.99	0.76
193	5	0.311	0.005	1.61	10.09	5.04	3.36	9.63	4.98	3.34
186	5.1	0.355	0.003	0.85	12.84	6.42	4.28	12.62	6.39	4.27
149	10	0.44	0.05	11.36	18.17	9.08	6.06	5.53	4.89	4.19
55	5.2	0.497	0.124	24.95	21.74	10.87	7.25	2.78	2.71	2.61
199	5.1	0.65	0.07	10.77	31.32	15.66	10.44	6.96	6.5	5.9
213	5	1.3*	0.1	7.69	72.05	36.02	24.02	11.36	10.96	10.37
211	5.2	7.264*	0.525	7.23	445.68	222.84	148.56	13.54	13.53	13.49
76	5	492.73*	35	7.1	30859.38	15429.69	10286.46	14.07	14.07	14.07
					Mo (0.034 ± 0.007) [mg/kg]					
192	5.2	0.05	0.004	8	4.28	2.14	1.43	2.92	1.89	1.34
					Na (56 ± 4.888) [mg/kg]					
149	5	31.03	0.9	2.9	-10.22	-5.11	-3.41	9.59	5.02	3.38
186	5.1	33.9	4.47	13.19	-9.04	-4.52	-3.01	4.34	3.34	2.57
193	5	34.5	0.015	0.04	-8.8	-4.4	-2.93	8.8	4.4	2.93
152	5.2	37	0.7	1.89	-7.77	-3.89	-2.59	7.47	3.85	2.58
184	5	47.5	1.9	4	-3.48	-1.74	-1.16	2.75	1.62	1.12
61	5.2	51.2	4.5	8.79	-1.96	-0.98	-0.65	0.94	0.72	0.56
194	5.1	51.6	2.14	4.15	-1.8	-0.9	-0.6	1.35	0.82	0.58
195	5	53.867	3.2	5.94	-0.87	-0.44	-0.29	0.53	0.37	0.27
224	5	53.9	0.8	1.48	-0.86	-0.43	-0.29	0.82	0.42	0.28
169	5.1	54.1	4	7.39	-0.78	-0.39	-0.26	0.41	0.3	0.23
222	5.1	55.1	2.2	3.99	-0.37	-0.18	-0.12	0.27	0.17	0.12

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED z- AND u-SCORES FOR THE LAND-PLANT MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	k = 1.0	k = 1.5	k = 0.5	k = 1.0	k = 1.5
199	5.1	55.17	2.82	5.11	-0.34	-0.17	-0.11	0.22	0.15	0.11
176	5	55.5	0.8	1.44	-0.2	-0.1	-0.07	0.19	0.1	0.07
215	5.1	55.9	4.6	8.23	-0.04	-0.02	-0.01	0.02	0.01	0.01
172	5.1	56.4	2.3	4.08	0.16	0.08	0.05	0.12	0.07	0.05
198	5.1	56.4	2	3.55	0.16	0.08	0.05	0.13	0.08	0.05
170	5	57.2	2.6	4.55	0.49	0.25	0.16	0.34	0.22	0.15
40	5.1	59	3	5.08	1.23	0.61	0.41	0.78	0.52	0.38
203	5	60.2	1.38	2.29	1.72	0.86	0.57	1.5	0.83	0.56
55	5.2	60.43	0.423	0.7	1.81	0.91	0.6	1.79	0.9	0.6
192	5.2	62.5	2.6	4.16	2.66	1.33	0.89	1.82	1.17	0.84
175	5.2	64.9	10.3	15.87	3.64	1.82	1.21	0.84	0.78	0.7
178	5.1	80	8.38	10.48	9.82	4.91	3.27	2.75	2.47	2.16
76	5	83.1	4	4.81	11.09	5.54	3.7	5.78	4.29	3.24
213	5	129.3*	8.1	6.26	29.99	15	10	8.66	7.75	6.71
211	5.2	164.375*	6.497	3.95	44.34	22.17	14.78	15.61	13.33	11.06
				Nd [mg/kg]						
152	5.2	0.021	0.001	4.76	-	-	-	-	-	-
215	5.1	0.031	0.001	3.23	-	-	-	-	-	-
84	5.2	60*	10	16.67	-	-	-	-	-	-
				Rb (0.106 ± 0.023) [mg/kg]						
186	5.1	0.09	0.024	26.67	-1.37	-0.69	-0.46	0.6	0.48	0.38
192	5.2	0.098	0.007	7.14	-0.69	-0.34	-0.23	0.59	0.33	0.22
214	5	0.098	0.002	2.04	-0.69	-0.34	-0.23	0.68	0.34	0.23
40	5.1	0.1	0.01	10	-0.51	-0.26	-0.17	0.39	0.24	0.16
170	5	0.112	0.02	17.86	0.51	0.26	0.17	0.26	0.2	0.15
215	5.1	0.113	0.004	3.54	0.6	0.3	0.2	0.57	0.3	0.2
199	5.1	0.12	0.03	25	1.2	0.6	0.4	0.43	0.37	0.3
61	5.2	0.127	0.043	33.86	1.8	0.9	0.6	0.47	0.43	0.38
55	5.2	0.172*	0.046	26.74	5.66	2.83	1.89	1.39	1.28	1.14
				Ru [mg/kg]						
222	5.1	0.236	0.035	14.83	-	-	-	-	-	-
172	5.1	0.247	0.033	13.36	-	-	-	-	-	-
				Sb (0.012 ± 0.003) [mg/kg]						
61	5.1	0.009	0.001	11.11	-2.27	-1.14	-0.76	1.81	1.06	0.73
40	5.1	0.01	0.001	10	-1.52	-0.76	-0.51	1.21	0.71	0.49
198	5.1	0.01	0.001	10	-1.52	-0.76	-0.51	1.21	0.71	0.49
183	5.1	0.01	0.001	10	-1.52	-0.76	-0.51	1.21	0.71	0.49
172	5.1	0.011	0.002	18.18	-0.76	-0.38	-0.25	0.42	0.3	0.23
215	5.1	0.011	0.002	18.18	-0.76	-0.38	-0.25	0.42	0.3	0.23
199	5.1	0.012	0.002	16.67	0	0	0	0	0	0
222	5.1	0.012	0.002	16.67	0	0	0	0	0	0
193	5	0.014	0.005	35.71	1.52	0.76	0.51	0.39	0.35	0.31
186	5.1	0.014	0.002	14.29	1.52	0.76	0.51	0.83	0.6	0.45
203	5	0.016	0.001	6.25	3.03	1.52	1.01	2.42	1.42	0.98
55	5.2	0.017	0.003	17.65	3.79	1.89	1.26	1.53	1.25	1.01
192	5.2	0.018	0.001	5.56	4.55	2.27	1.52	3.62	2.13	1.47

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE MARINE SEDIMENT TEST MATERIAL.

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
178	5.1	0.021	0.002	9.52	6.82	3.41	2.27	3.76	2.72	2.03
152	5.2	0.022	0.002	9.09	7.58	3.79	2.53	4.17	3.02	2.25
194	5.1	0.118*	0.015	12.71	80.3	40.15	26.77	7.04	6.96	6.83
					Sc (0.01 ± 0.002) [mg/kg]					
152	5.2	0.007*	0.001	14.29	-2.73	-1.36	-0.91	2.02	1.24	0.87
172	5.1	0.009	0.001	11.11	-0.91	-0.45	-0.3	0.67	0.41	0.29
61	5.2	0.009	0.001	11.11	-0.91	-0.45	-0.3	0.67	0.41	0.29
222	5.1	0.009	0.001	11.11	-0.91	-0.45	-0.3	0.67	0.41	0.29
224	5	0.01	0.001	10	0	0	0	0	0	0
203	5	0.01	0.002	20	0	0	0	0	0	0
176	5	0.01	0.001	10	0	0	0	0	0	0
169	5.1	0.01	0.001	10	0	0	0	0	0	0
199	5.1	0.01	0.002	20	0	0	0	0	0	0
183	5.1	0.01	0.001	10	0	0	0	0	0	0
214	5	0.01	0.001	10	0	0	0	0	0	0
192	5.2	0.01	0.001	10	0	0	0	0	0	0
194	5.1	0.01	0.008	80	0	0	0	0	0	0
193	5	0.01	0.001	10	0	0	0	0	0	0
198	5.1	0.01	0.001	10	0	0	0	0	0	0
55	5.2	0.011	0.001	9.09	0.91	0.45	0.3	0.67	0.41	0.29
184	5	0.011	0.001	9.09	0.91	0.45	0.3	0.67	0.41	0.29
170	5	0.011	0.002	18.18	0.91	0.45	0.3	0.44	0.34	0.26
215	5.1	0.011	0.001	9.09	0.91	0.45	0.3	0.67	0.41	0.29
139	10	0.011	0.001	9.09	0.91	0.45	0.3	0.67	0.41	0.29
40	5.1	0.012	0.001	8.33	1.82	0.91	0.61	1.35	0.83	0.58
195	5	0.013*	0.002	15.38	2.73	1.36	0.91	1.31	1.01	0.78
76	5	0.023*	0.004	17.39	11.82	5.91	3.94	3.13	2.85	2.51
178	5.1	0.028*	0.002	7.14	16.36	8.18	5.45	7.89	6.05	4.66
211	5.2	0.18*	0.026	14.44	154.55	77.27	51.52	6.53	6.52	6.49
					Se [mg/kg]					
84	5.2	5	2	40	-	-	-	-	-	-
					Sm (0.003 ± 0.001) [mg/kg]					
203	5	0.003	0.001	33.33	0	0	0	0	0	0
183	5.1	0.003	0.001	33.33	0	0	0	0	0	0
169	5.1	0.003	0.001	33.33	0	0	0	0	0	0
40	5.1	0.003	0.001	33.33	0	0	0	0	0	0
55	5.2	0.003	0.001	33.33	0	0	0	0	0	0
198	5.1	0.003	0.001	33.33	0	0	0	0	0	0
192	5.2	0.004	0.001	25	3.03	1.52	1.01	0.95	0.83	0.71
152	5.2	0.004	0.001	25	3.03	1.52	1.01	0.95	0.83	0.71
176	5	0.004	0.001	25	3.03	1.52	1.01	0.95	0.83	0.71
214	5	0.004	0.001	25	3.03	1.52	1.01	0.95	0.83	0.71
224	5	0.004	0.001	25	3.03	1.52	1.01	0.95	0.83	0.71
149	5	0.007*	0.002	28.57	12.12	6.06	4.04	1.97	1.9	1.79
211	5.2	0.015*	0.003	20	36.36	18.18	12.12	3.98	3.91	3.8

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED z- AND u-SCORES FOR THE LAND-PLANT MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	k = 1.0	k = 1.5	k = 0.5	k = 1.0	k = 1.5
Sr (0.65 ± 0.111) [mg/kg]										
203	5	0.505*	0.13	25.74	-2.61	-1.31	-0.87	1.03	0.85	0.69
215	5.1	1.02	0.28	27.45	6.67	3.34	2.22	1.3	1.23	1.14
192	5.2	1.06	0.1	9.43	7.39	3.7	2.46	3.59	2.75	2.11
40	5.1	1.2	0.4	33.33	9.92	4.96	3.31	1.36	1.32	1.27
214	5	1.29	0.052	4.03	11.54	5.77	3.85	8.42	5.22	3.67
172	5.1	5.87*	2.41	41.06	94.1	47.05	31.37	2.17	2.16	2.16
Th (0.007 ± 0.002) [mg/kg]										
198	5.1	0.006*	0.001	16.67	-1.3	-0.65	-0.43	0.79	0.54	0.4
203	5	0.006*	0.001	16.67	-1.3	-0.65	-0.43	0.79	0.54	0.4
40	5.1	0.007	0.001	14.29	0	0	0	0	0	0
192	5.2	0.007	0.001	14.29	0	0	0	0	0	0
61	5.2	0.007	0.001	14.29	0	0	0	0	0	0
215	5.1	0.007	0.001	14.29	0	0	0	0	0	0
199	5.1	0.007	0.002	28.57	0	0	0	0	0	0
55	5.2	0.009*	0.002	22.22	2.6	1.3	0.87	0.93	0.79	0.65
Ti [mg/kg]										
183	5.1	107	5	4.67	-	-	-	-	-	-
211	5.2	8421.363	1096.495	13.02	-	-	-	-	-	-
U [mg/kg]										
198	5.1	0.003	0.001	33.33	-	-	-	-	-	-
203	5	0.003	0.001	33.33	-	-	-	-	-	-
192	5.2	0.013*	0.001	7.69	-	-	-	-	-	-
V (0.075 ± 0.017) [mg/kg]										
152	5.2	0.059	0.008	13.56	-1.94	-0.97	-0.65	1.39	0.87	0.62
178	5.1	0.059	0.01	16.95	-1.94	-0.97	-0.65	1.23	0.83	0.6
172	5.1	0.064	0.018	28.13	-1.33	-0.67	-0.44	0.56	0.45	0.36
224	5	0.075	0.014	18.67	0	0	0	0	0	0
222	5.1	0.075	0.029	38.67	0	0	0	0	0	0
176	5	0.085	0.014	16.47	1.21	0.61	0.4	0.62	0.46	0.35
215	5.1	0.087	0.03	34.48	1.45	0.73	0.48	0.39	0.35	0.31
199	5.1	0.11	0.03	27.27	4.24	2.12	1.41	1.12	1.02	0.9
55	5.2	0.267*	0.033	12.36	23.27	11.64	7.76	5.64	5.2	4.65
211	5.2	0.968*	0.287	29.65	108.24	54.12	36.08	3.11	3.11	3.1
W [mg/kg]										
172	5.1	0.026	0.009	34.62	-	-	-	-	-	-
222	5.1	0.027	0.009	33.33	-	-	-	-	-	-
Zn (1.16 ± 0.181) [mg/kg]										
198	5.1	0.32	0.033	10.31	-9.26	-4.63	-3.09	8.7	4.55	3.06
61	5.2	0.362	0.051	14.09	-8.8	-4.4	-2.93	7.67	4.23	2.88
40	5.1	0.45	0.03	6.67	-7.83	-3.91	-2.61	7.43	3.86	2.59
176	5	0.52	0.06	11.54	-7.05	-3.53	-2.35	5.88	3.35	2.3
184	5	0.6	0.01	1.67	-6.17	-3.09	-2.06	6.13	3.08	2.06

TABLE 3a (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE MARINE SEDIMENT TEST MATERIAL.

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
224	5	0.62	0.06	9.68	-5.95	-2.98	-1.98	4.96	2.83	1.94
199	5.1	0.8	0.13	16.25	-3.97	-1.98	-1.32	2.27	1.61	1.19
186	5.1	1.52	0.09	5.92	3.97	1.98	1.32	2.82	1.78	1.26
203	5	2.18	0.67	30.73	11.24	5.62	3.75	1.51	1.47	1.41
149	5	2.19	1.53	69.86	11.35	5.68	3.78	0.67	0.67	0.66
55	5.2	2.49	0.339	13.61	14.66	7.33	4.89	3.79	3.46	3.06
192	5.2	2.53	0.15	5.93	15.1	7.55	5.03	7.81	5.82	4.41
178	5.1	2.95	0.34	11.53	19.73	9.86	6.58	5.09	4.64	4.11
170	5	3.14	0.29	9.24	21.82	10.91	7.27	6.52	5.79	4.98
193	5	6.16*	0.01	0.16	55.11	27.55	18.37	54.78	27.51	18.36
139	10	8.907*	0.905	10.16	85.38	42.69	28.46	8.52	8.39	8.2
211	5.2	44.977*	5.239	11.65	482.93	241.47	160.98	8.36	8.36	8.35

TABLE 3b. SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
Al (5.18 ± 0.162) [%]										
211	5.2	1.494	0.324	21.69	-45.58	-22.79	-15.19	11.04	10.18	9.11
186	5.1	1.8	0.06	3.33	-41.79	-20.9	-13.93	33.56	19.59	13.52
195	5	4.39	0.294	6.7	-9.77	-4.88	-3.26	2.59	2.35	2.07
76	5	4.58	0.3	6.55	-7.42	-3.71	-2.47	1.93	1.76	1.56
222	5.1	4.861	0.196	4.03	-3.94	-1.97	-1.31	1.5	1.26	1.02
172	5.1	4.92	0.198	4.02	-3.21	-1.61	-1.07	1.22	1.02	0.83
182	5.1	5.139	0.18	3.5	-0.51	-0.25	-0.17	0.21	0.17	0.14
176	5	5.22	0.09	1.72	0.49	0.25	0.16	0.33	0.22	0.15
194	5.1	5.23	0.22	4.21	0.62	0.31	0.21	0.21	0.18	0.15
224	5	5.25	0.09	1.71	0.87	0.43	0.29	0.58	0.38	0.27
215	5.1	5.26	0.16	3.04	0.99	0.49	0.33	0.45	0.35	0.28
178	5.1	5.35	0.17	3.18	2.1	1.05	0.7	0.9	0.72	0.57
175	5.2	5.388	0.095	1.76	2.57	1.29	0.86	1.67	1.11	0.8
183	5.4	5.9	0.112	1.9	8.9	4.45	2.97	5.21	3.66	2.69
199	5.1	7.09	0.13	1.83	23.62	11.81	7.87	12.48	9.2	6.94
152	5.2	7.375	0.097	1.32	27.14	13.57	9.05	17.38	11.64	8.4
84	5.2	9.2	1	10.87	49.71	24.85	16.57	4.01	3.97	3.91
Ca (6.49 ± 0.196) [%]										
199	5.1	4.36*	1.06	24.31	-21.75	-10.87	-7.25	2	1.98	1.94
186	5.1	5.75*	0.063	1.1	-7.55	-3.78	-2.52	6.35	3.6	2.46
222	5.1	6.589	0.292	4.43	1.01	0.51	0.34	0.32	0.28	0.24
192	5.2	6.64	0.289	4.35	1.53	0.77	0.51	0.49	0.43	0.36
172	5.1	6.667	0.295	4.42	1.81	0.9	0.6	0.57	0.5	0.43
169	5.1	6.71	0.24	3.58	2.25	1.12	0.75	0.85	0.71	0.58
76	5	6.79	1	14.73	3.06	1.53	1.02	0.3	0.29	0.29
198	5.1	6.856	0.265	3.87	3.74	1.87	1.25	1.3	1.11	0.92
55	5.2	6.9	0.19	2.75	4.19	2.09	1.4	1.92	1.5	1.17
203	5	6.96	0.73	10.49	4.8	2.4	1.6	0.64	0.62	0.6
182	5.1	6.99	0.433	6.19	5.1	2.55	1.7	1.13	1.05	0.96
175	5.2	7.069	0.392	5.55	5.91	2.96	1.97	1.43	1.32	1.18
223	10	7.11	0.82	11.53	6.33	3.16	2.11	0.75	0.74	0.71
176	5	7.22	0.19	2.63	7.45	3.73	2.48	3.42	2.67	2.09
215	5.1	7.25	0.45	6.21	7.76	3.88	2.59	1.65	1.55	1.41
224	5	7.29	0.19	2.61	8.17	4.08	2.72	3.74	2.93	2.29
183	5.4	7.4	0.177	2.39	9.29	4.65	3.1	4.5	3.45	2.65
152	5.2	7.458	0.087	1.17	9.88	4.94	3.29	7.39	4.52	3.16
184	5	7.6	0.5	6.58	11.33	5.67	3.78	2.18	2.07	1.91
178	5.1	7.66	0.32	4.18	11.94	5.97	3.98	3.5	3.12	2.69
61	5.2	7.8	2.6	33.33	13.37	6.69	4.46	0.5	0.5	0.5
194	5.1	8.33*	0.91	10.92	18.79	9.39	6.26	2.01	1.98	1.92
Fe (2.63 ± 0.091) [%]										
211	5.2	1.946*	0.191	9.82	-15.04	-7.52	-5.01	3.48	3.23	2.91
149	5	2.53	0.015	0.59	-2.2	-1.1	-0.73	2.09	1.08	0.73
199	5.1	2.57	0.05	1.95	-1.32	-0.66	-0.44	0.89	0.58	0.41

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
172	5.1	2.602	0.104	4	-0.62	-0.31	-0.21	0.25	0.2	0.16
222	5.1	2.643	0.106	4.01	0.29	0.14	0.1	0.11	0.09	0.08
176	5	2.66	0.04	1.5	0.66	0.33	0.22	0.5	0.3	0.21
192	5.2	2.676	0.07	2.62	1.01	0.51	0.34	0.55	0.4	0.3
224	5	2.69	0.04	1.49	1.32	0.66	0.44	0.99	0.6	0.42
40	5.1	2.7	0.15	5.56	1.54	0.77	0.51	0.45	0.4	0.35
215	5.1	2.71	0.09	3.32	1.76	0.88	0.59	0.79	0.63	0.49
61	5.2	2.711	0.056	2.07	1.78	0.89	0.59	1.12	0.76	0.55
169	5.1	2.73	0.1	3.66	2.2	1.1	0.73	0.91	0.74	0.59
170	5	2.738	0.087	3.18	2.38	1.19	0.79	1.1	0.86	0.67
152	5.2	2.738	0.065	2.37	2.38	1.19	0.79	1.36	0.97	0.71
193	5	2.75	0.6	21.82	2.64	1.32	0.88	0.2	0.2	0.2
203	5	2.76	0.071	2.57	2.86	1.43	0.95	1.54	1.13	0.85
198	5.1	2.777	0.102	3.67	3.23	1.62	1.08	1.32	1.08	0.86
214	5	2.79	0.039	1.4	3.52	1.76	1.17	2.67	1.62	1.13
183	5.1	2.818	0.054	1.92	4.13	2.07	1.38	2.66	1.78	1.28
184	5	2.85	0.09	3.16	4.84	2.42	1.61	2.18	1.72	1.35
55	5.2	2.85	0.029	1.02	4.84	2.42	1.61	4.08	2.3	1.58
139	10	2.86	0.143	5	5.06	2.53	1.69	1.53	1.36	1.16
194	5.1	2.87	0.081	2.82	5.28	2.64	1.76	2.58	1.97	1.51
175	5.2	2.901	0.067	2.31	5.96	2.98	1.99	3.35	2.4	1.78
195	5	2.934	0.15	5.11	6.69	3.34	2.23	1.94	1.73	1.5
178	5.1	2.96	0.087	2.94	7.26	3.63	2.42	3.36	2.62	2.04
213	5.2	2.98	0.15	5.03	7.7	3.85	2.57	2.23	2	1.73
186	5.1	3.02	0.06	1.99	8.58	4.29	2.86	5.18	3.58	2.62
				K (2 ± 0.072) [%]						
213	5.2	1.365*	0.16	11.72	-17.62	-8.81	-5.87	3.87	3.62	3.29
149	5	1.49*	0.26	17.45	-14.15	-7.08	-4.72	1.94	1.89	1.81
192	5.2	1.626	0.226	13.9	-10.38	-5.19	-3.46	1.63	1.58	1.49
199	5.1	1.78	0.19	10.67	-6.11	-3.05	-2.04	1.14	1.08	1.01
203	5	1.83	0.089	4.86	-4.72	-2.36	-1.57	1.77	1.48	1.21
40	5.1	1.9	0.2	10.53	-2.78	-1.39	-0.93	0.49	0.47	0.44
176	5	1.9	0.05	2.63	-2.78	-1.39	-0.93	1.62	1.14	0.84
224	5	1.91	0.05	2.62	-2.5	-1.25	-0.83	1.46	1.03	0.76
215	5.1	1.94	0.07	3.61	-1.67	-0.83	-0.56	0.76	0.6	0.47
222	5.1	1.943	0.082	4.22	-1.58	-0.79	-0.53	0.64	0.52	0.42
183	5.1	1.949	0.071	3.64	-1.42	-0.71	-0.47	0.64	0.5	0.39
172	5.1	1.967	0.082	4.17	-0.92	-0.46	-0.31	0.37	0.3	0.24
198	5.1	2.022	0.091	4.5	0.61	0.31	0.2	0.22	0.19	0.16
169	5.1	2.03	0.07	3.45	0.83	0.42	0.28	0.38	0.3	0.23
186	5.1	2.04	0.12	5.88	1.11	0.56	0.37	0.32	0.29	0.25
211	5.2	2.078	0.305	14.68	2.16	1.08	0.72	0.25	0.25	0.24
55	5.2	2.09	0.077	3.68	2.5	1.25	0.83	1.06	0.85	0.68
152	5.2	2.11	0.117	5.55	3.05	1.53	1.02	0.9	0.8	0.69
193	5	2.13	0.016	0.75	3.61	1.8	1.2	3.3	1.76	1.19
178	5.1	2.2	0.42	19.09	5.55	2.78	1.85	0.47	0.47	0.46
194	5.1	2.22	0.17	7.66	6.11	3.05	2.04	1.27	1.19	1.09
175	5.2	2.224	0.124	5.58	6.22	3.11	2.07	1.73	1.56	1.36
170	5	2.229	0.237	10.63	6.35	3.18	2.12	0.96	0.92	0.88
195	5	2.55*	0.19	7.45	15.26	7.63	5.09	2.84	2.71	2.52

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
76	5	2.82*	0.2	7.09	22.76	11.38	7.59	4.04	3.86	3.61
Mg (1.118 ± 0.044) [%]										
186	5.1	0.35	0.015	4.29	-34.93	-17.47	-11.64	28.86	16.53	11.35
152	5.2	0.459	0.023	5.01	-29.97	-14.99	-9.99	20.71	13.28	9.43
76	5	0.646	0.07	10.84	-21.47	-10.73	-7.16	6.43	5.71	4.91
199	5.1	0.97	0.089	9.18	-6.73	-3.37	-2.24	1.61	1.49	1.34
222	5.1	1.031	0.081	7.86	-3.96	-1.98	-1.32	1.04	0.94	0.83
172	5.1	1.044	0.076	7.28	-3.37	-1.68	-1.12	0.94	0.84	0.74
215	5.1	1.191	0.039	3.27	3.32	1.66	1.11	1.63	1.24	0.95
224	5	1.23	0.06	4.88	5.09	2.55	1.7	1.75	1.51	1.26
176	5	1.25	0.07	5.6	6	3	2	1.8	1.6	1.37
223	10	1.48	0.15	10.14	16.46	8.23	5.49	2.39	2.32	2.21
193	5	1.5	0.02	1.33	17.37	8.69	5.79	12.85	7.91	5.54
178	5.1	1.52	0.16	10.53	18.28	9.14	6.09	2.49	2.42	2.32
Na (2.38 ± 0.084) [%]										
211	5.2	0.351*	0.014	3.99	-48.57	-24.29	-16.19	46.05	23.95	16.09
149	5	2.23	0.027	1.21	-3.59	-1.8	-1.2	3.02	1.71	1.17
199	5.1	2.24	0.14	6.25	-3.35	-1.68	-1.12	0.96	0.86	0.75
192	5.2	2.268	0.089	3.92	-2.68	-1.34	-0.89	1.14	0.92	0.73
183	5.1	2.284	0.042	1.84	-2.3	-1.15	-0.77	1.62	1.03	0.73
213	5.2	2.312	0.143	6.19	-1.63	-0.81	-0.54	0.46	0.41	0.36
176	5	2.32	0.04	1.72	-1.44	-0.72	-0.48	1.04	0.65	0.46
224	5	2.33	0.04	1.72	-1.2	-0.6	-0.4	0.86	0.54	0.38
40	5.1	2.38	0.13	5.46	0	0	0	0	0	0
186	5.1	2.39	0.1	4.18	0.24	0.12	0.08	0.09	0.08	0.06
178	5.1	2.4	0.08	3.33	0.48	0.24	0.16	0.22	0.17	0.13
193	5	2.41	0.002	0.08	0.72	0.36	0.24	0.72	0.36	0.24
61	5.2	2.42	0.16	6.61	0.96	0.48	0.32	0.24	0.22	0.2
184	5	2.42	0.2	8.26	0.96	0.48	0.32	0.2	0.18	0.17
222	5.1	2.427	0.097	4	1.13	0.56	0.38	0.45	0.37	0.3
172	5.1	2.445	0.098	4.01	1.56	0.78	0.52	0.61	0.5	0.41
170	5	2.453	0.067	2.73	1.75	0.87	0.58	0.92	0.68	0.51
182	5.1	2.47	0.072	2.91	2.15	1.08	0.72	1.08	0.82	0.62
175	5.2	2.474	0.077	3.11	2.25	1.13	0.75	1.07	0.83	0.64
215	5.1	2.48	0.19	7.66	2.39	1.2	0.8	0.51	0.48	0.44
203	5	2.49	0.026	1.04	2.63	1.32	0.88	2.24	1.26	0.86
198	5.1	2.5	0.089	3.56	2.87	1.44	0.96	1.22	0.98	0.78
169	5.1	2.55	0.09	3.53	4.07	2.03	1.36	1.71	1.38	1.1
152	5.2	2.557	0.02	0.78	4.24	2.12	1.41	3.82	2.06	1.39
194	5.1	2.56	0.085	3.32	4.31	2.15	1.44	1.9	1.51	1.19
55	5.2	2.58	0.003	0.12	4.79	2.39	1.6	4.78	2.39	1.6
195	5	2.75	0.074	2.69	8.86	4.43	2.95	4.35	3.32	2.54
76	5	2.81	0.2	7.12	10.29	5.15	3.43	2.1	1.98	1.82
223	10	2.82	0.43	15.25	10.53	5.27	3.51	1.02	1	0.98
84	5.2	3.4*	0.1	2.94	24.42	12.21	8.14	9.41	7.83	6.36
As (11.56 ± 1.279) [mg/kg]										
76	5	10.6	0.7	6.6	-1.5	-0.75	-0.5	1.01	0.66	0.47

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
176	5	11.1	0.3	2.7	-0.72	-0.36	-0.24	0.65	0.35	0.24
222	5.1	11.1	0.5	4.5	-0.72	-0.36	-0.24	0.57	0.33	0.23
169	5.1	11.2	0.5	4.46	-0.56	-0.28	-0.19	0.44	0.26	0.18
192	5.2	11.28	0.46	4.08	-0.44	-0.22	-0.15	0.36	0.21	0.14
215	5.1	11.3	3.8	33.63	-0.41	-0.2	-0.14	0.07	0.06	0.06
193	5	11.5	0.016	0.14	-0.09	-0.05	-0.03	0.09	0.05	0.03
172	5.1	11.6	0.5	4.31	0.06	0.03	0.02	0.05	0.03	0.02
199	5.1	11.65	3.99	34.25	0.14	0.07	0.05	0.02	0.02	0.02
170	5	11.75	0.35	2.98	0.3	0.15	0.1	0.26	0.14	0.1
61	5.1	11.9	1.3	10.92	0.53	0.27	0.18	0.23	0.19	0.15
184	5	11.9	0.51	4.29	0.53	0.27	0.18	0.42	0.25	0.17
183	5.1	11.9	1.2	10.08	0.53	0.27	0.18	0.25	0.19	0.15
203	5	11.9	0.66	5.55	0.53	0.27	0.18	0.37	0.24	0.17
224	5	11.9	0.3	2.52	0.53	0.27	0.18	0.48	0.26	0.18
152	5.2	12.1	1.5	12.4	0.84	0.42	0.28	0.33	0.27	0.22
55	5.2	12.2	1.59	13.03	1	0.5	0.33	0.37	0.31	0.26
194	5.1	12.3	0.1	0.81	1.16	0.58	0.39	1.14	0.58	0.39
198	5.1	12.3	0.5	4.07	1.16	0.58	0.39	0.91	0.54	0.37
211	5.2	12.309	1.035	8.41	1.17	0.59	0.39	0.62	0.46	0.34
214	5	12.57	0.311	2.47	1.58	0.79	0.53	1.42	0.77	0.52
175	5.2	12.578	0.217	1.73	1.59	0.8	0.53	1.51	0.78	0.53
178	5.1	12.8	0.63	4.92	1.94	0.97	0.65	1.38	0.87	0.61
40	5.1	13.3	1	7.52	2.72	1.36	0.91	1.47	1.07	0.8
195	5	155.012*	22	14.19	224.25	112.12	74.75	6.52	6.51	6.5
B [mg/kg]										
183	5.4	92	0.828	0.9	-	-	-	-	-	-
Ba (1023 ± 57.666) [mg/kg]										
76	5	9.22*	0.6	6.51	-35.16	-17.58	-11.72	35.15	17.58	11.72
211	5.2	15.036*	1.9	12.64	-34.96	-17.48	-11.65	34.88	17.47	11.65
169	5.1	864	40	4.63	-5.51	-2.76	-1.84	3.22	2.27	1.67
199	5.1	869	57	6.56	-5.34	-2.67	-1.78	2.41	1.9	1.49
152	5.2	893	21	2.35	-4.51	-2.25	-1.5	3.64	2.12	1.46
223	10	927	72	7.77	-3.33	-1.66	-1.11	1.24	1.04	0.85
198	5.1	938	35	3.73	-2.95	-1.47	-0.98	1.87	1.26	0.91
222	5.1	964	72	7.47	-2.05	-1.02	-0.68	0.76	0.64	0.52
172	5.1	975	60	6.15	-1.66	-0.83	-0.55	0.72	0.58	0.46
178	5.1	1003	37	3.69	-0.69	-0.35	-0.23	0.43	0.29	0.21
176	5	1006	19	1.89	-0.59	-0.29	-0.2	0.49	0.28	0.19
224	5	1016	19	1.87	-0.24	-0.12	-0.08	0.2	0.12	0.08
183	5.1	1030	21	2.04	0.24	0.12	0.08	0.2	0.11	0.08
192	5.2	1032	43	4.17	0.31	0.16	0.1	0.17	0.13	0.09
215	5.1	1047	32	3.06	0.83	0.42	0.28	0.56	0.36	0.26
213	5.2	1077	57.6	5.35	1.87	0.94	0.62	0.84	0.66	0.52
40	5.1	1090	74	6.79	2.32	1.16	0.77	0.84	0.71	0.59
186	5.1	1100	49	4.45	2.67	1.34	0.89	1.35	1.02	0.77
61	5.2	1100	260	23.64	2.67	1.34	0.89	0.29	0.29	0.28
214	5	1107	31.837	2.88	2.91	1.46	0.97	1.96	1.28	0.91
184	5	1110	60	5.41	3.02	1.51	1.01	1.31	1.05	0.83
175	5.2	1116	106	9.5	3.23	1.61	1.08	0.85	0.77	0.68

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
				Br (207.17 ± 14.851) [mg/kg]						
152	5.2	181	4	2.21	-3.52	-1.76	-1.17	3.1	1.7	1.16
213	5.2	186.7	5.6	3	-2.76	-1.38	-0.92	2.2	1.29	0.89
184	5	190	8	4.21	-2.31	-1.16	-0.77	1.57	1.02	0.73
178	5.1	198	5.85	2.95	-1.23	-0.62	-0.41	0.97	0.57	0.4
169	5.1	202	7	3.47	-0.7	-0.35	-0.23	0.51	0.31	0.22
176	5	203	3	1.48	-0.56	-0.28	-0.19	0.52	0.28	0.19
172	5.1	204	8	3.92	-0.43	-0.21	-0.14	0.29	0.19	0.13
224	5	204	3	1.47	-0.43	-0.21	-0.14	0.4	0.21	0.14
55	5.2	204.34	0.817	0.4	-0.38	-0.19	-0.13	0.38	0.19	0.13
222	5.1	210	8	3.81	0.38	0.19	0.13	0.26	0.17	0.12
183	5.1	211	4	1.9	0.52	0.26	0.17	0.45	0.25	0.17
61	5.1	212	12	5.66	0.65	0.33	0.22	0.34	0.25	0.19
192	5.2	212.8	7.9	3.71	0.76	0.38	0.25	0.52	0.33	0.24
199	5.1	214.2	3.67	1.71	0.95	0.47	0.32	0.85	0.46	0.31
198	5.1	215	8	3.72	1.05	0.53	0.35	0.72	0.46	0.33
40	5.1	216	12	5.56	1.19	0.59	0.4	0.63	0.46	0.35
215	5.1	217	7	3.23	1.32	0.66	0.44	0.96	0.6	0.42
194	5.1	226	5.55	2.46	2.54	1.27	0.85	2.03	1.19	0.82
				Ce (61.1 ± 5.263) [mg/kg]						
192	5.2	51.65	1.97	3.81	-3.59	-1.8	-1.2	2.87	1.68	1.16
176	5	54.1	0.8	1.48	-2.66	-1.33	-0.89	2.54	1.31	0.88
224	5	54.8	0.8	1.46	-2.39	-1.2	-0.8	2.29	1.18	0.79
193	5	56.3	0.02	0.04	-1.82	-0.91	-0.61	1.82	0.91	0.61
172	5.1	56.8	2.3	4.05	-1.63	-0.82	-0.54	1.23	0.75	0.52
61	5.2	57	4.2	7.37	-1.56	-0.78	-0.52	0.83	0.61	0.46
186	5.1	57.6	2.65	4.6	-1.33	-0.66	-0.44	0.94	0.59	0.42
170	5	58.354	0.918	1.57	-1.04	-0.52	-0.35	0.99	0.51	0.35
199	5.1	60	8	13.33	-0.42	-0.21	-0.14	0.13	0.11	0.1
169	5.1	60.6	2.4	3.96	-0.19	-0.09	-0.06	0.14	0.09	0.06
223	10	61.3	4.9	7.99	0.08	0.04	0.03	0.04	0.03	0.02
55	5.2	61.98	1.18	1.9	0.33	0.17	0.11	0.31	0.16	0.11
175	5.2	62.01	2.8	4.52	0.35	0.17	0.12	0.24	0.15	0.11
198	5.1	62.2	2.2	3.54	0.42	0.21	0.14	0.32	0.19	0.13
184	5	63.8	2	3.13	1.03	0.51	0.34	0.82	0.48	0.33
40	5.1	64	4	6.25	1.1	0.55	0.37	0.61	0.44	0.33
178	5.1	64.3	2.04	3.17	1.22	0.61	0.41	0.96	0.57	0.39
215	5.1	64.3	3.5	5.44	1.22	0.61	0.41	0.73	0.51	0.37
183	5.1	64.5	1.2	1.86	1.29	0.65	0.43	1.18	0.63	0.43
139	10	64.9	3.8	5.86	1.44	0.72	0.48	0.82	0.59	0.43
214	5	65	1.799	2.77	1.48	0.74	0.49	1.22	0.7	0.48
152	5.2	66.6	1.8	2.7	2.09	1.04	0.7	1.72	0.99	0.68
194	5.1	67	1.82	2.72	2.24	1.12	0.75	1.84	1.06	0.73
203	5	208.6*	17	8.15	56.05	28.02	18.68	8.57	8.29	7.87
				Cl (20900 ± 748.160) [mg/kg]						
213	5.2	15177*	1630	10.74	-15.3	-7.65	-5.1	3.42	3.19	2.89
152	5.2	17561*	687	3.91	-8.93	-4.46	-2.98	4.27	3.29	2.54

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
172	5.1	19558	794	4.06	-3.59	-1.79	-1.2	1.53	1.23	0.98
222	5.1	19714	799	4.05	-3.17	-1.59	-1.06	1.34	1.08	0.86
194	5.1	19800	890	4.49	-2.94	-1.47	-0.98	1.14	0.95	0.77
182	5.1	20780	748	3.6	-0.32	-0.16	-0.11	0.14	0.11	0.09
176	5	20900	400	1.91	0	0	0	0	0	0
224	5	21200	400	1.89	0.8	0.4	0.27	0.55	0.35	0.25
178	5.1	21400	780	3.64	1.34	0.67	0.45	0.58	0.46	0.37
199	5.1	21408	466	2.18	1.36	0.68	0.45	0.85	0.58	0.42
215	5.1	21440	880	4.1	1.44	0.72	0.48	0.56	0.47	0.38
183	5.4	23700*	0.033	0	7.49	3.74	2.5	7.49	3.74	2.5
149	10	27540*	130	0.47	17.75	8.88	5.92	16.77	8.74	5.88
Co (9.2 ± 1.054) [mg/kg]										
211	5.2	0.363*	0.085	23.42	-16.77	-8.39	-5.59	16.56	8.36	5.58
184	5	9.03	0.28	3.1	-0.32	-0.16	-0.11	0.28	0.16	0.11
176	5	9.14	0.14	1.53	-0.11	-0.06	-0.04	0.11	0.06	0.04
172	5.1	9.16	0.37	4.04	-0.08	-0.04	-0.03	0.06	0.04	0.02
149	5	9.19	0.05	0.54	-0.02	-0.01	-0.01	0.02	0.01	0.01
203	5	9.2	0.28	3.04	0	0	0	0	0	0
222	5.1	9.25	0.37	4	0.09	0.05	0.03	0.08	0.04	0.03
224	5	9.28	0.14	1.51	0.15	0.08	0.05	0.15	0.08	0.05
169	5.1	9.36	0.36	3.85	0.3	0.15	0.1	0.25	0.14	0.1
199	5.1	9.38	0.29	3.09	0.34	0.17	0.11	0.3	0.16	0.11
213	5.2	9.5	0.9	9.47	0.57	0.28	0.19	0.29	0.22	0.16
214	5	9.5	0.113	1.19	0.57	0.28	0.19	0.56	0.28	0.19
198	5.1	9.51	0.37	3.89	0.59	0.29	0.2	0.48	0.28	0.19
152	5.2	9.53	0.25	2.62	0.63	0.31	0.21	0.57	0.3	0.21
215	5.1	9.6	0.8	8.33	0.76	0.38	0.25	0.42	0.3	0.23
170	5	9.601	0.245	2.55	0.76	0.38	0.25	0.69	0.37	0.25
192	5.2	9.67	0.37	3.83	0.89	0.45	0.3	0.73	0.42	0.29
61	5.2	9.7	0.43	4.43	0.95	0.47	0.32	0.74	0.44	0.31
194	5.1	9.74	0.25	2.57	1.02	0.51	0.34	0.93	0.5	0.34
183	5.1	9.88	0.18	1.82	1.29	0.65	0.43	1.22	0.64	0.43
139	10	9.98	0.59	5.91	1.48	0.74	0.49	0.99	0.65	0.46
40	5.1	10	0.6	6	1.52	0.76	0.51	1	0.66	0.47
193	5	10.04	0.01	0.1	1.59	0.8	0.53	1.59	0.8	0.53
195	5	10.505*	0.4	3.81	2.48	1.24	0.83	1.97	1.16	0.8
178	5.1	10.6*	0.33	3.11	2.66	1.33	0.89	2.25	1.27	0.87
186	5.1	11.15*	0.22	1.97	3.7	1.85	1.23	3.42	1.81	1.22
175	5.2	11.51*	1.68	14.6	4.38	2.19	1.46	1.31	1.16	1
55	5.2	18.25*	0.31	1.7	17.18	8.59	5.73	14.8	8.24	5.62
Cr (74.4 ± 6.222) [mg/kg]										
211	5.2	0.618*	0.223	36.08	-23.72	-11.86	-7.91	23.66	11.85	7.9
152	5.2	68	3.4	5	-2.06	-1.03	-0.69	1.39	0.9	0.64
192	5.2	69.4	5.2	7.49	-1.61	-0.8	-0.54	0.83	0.62	0.47
213	5.2	71.1	3.9	5.49	-1.06	-0.53	-0.35	0.66	0.45	0.33
203	5	73	1.71	2.34	-0.45	-0.23	-0.15	0.39	0.22	0.15
170	5	75.425	3.446	4.57	0.33	0.16	0.11	0.22	0.14	0.1
184	5	76.9	2.6	3.38	0.8	0.4	0.27	0.62	0.37	0.26
199	5.1	77.1	2.78	3.61	0.87	0.43	0.29	0.65	0.4	0.28

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
224	5	79.5	1.3	1.64	1.64	0.82	0.55	1.51	0.8	0.54
176	5	79.7	1.3	1.63	1.7	0.85	0.57	1.57	0.83	0.56
222	5.1	79.9	3.2	4.01	1.77	0.88	0.59	1.23	0.79	0.56
139	10	80.9	4.8	5.93	2.09	1.04	0.7	1.14	0.83	0.62
214	5	81.3	0.932	1.15	2.22	1.11	0.74	2.12	1.1	0.74
172	5.1	81.3	3.3	4.06	2.22	1.11	0.74	1.52	0.98	0.7
175	5.2	81.57	4.42	5.42	2.3	1.15	0.77	1.33	0.94	0.69
76	5	81.63	4	4.9	2.32	1.16	0.77	1.43	0.98	0.71
198	5.1	81.8	2.9	3.55	2.38	1.19	0.79	1.74	1.08	0.76
61	5.2	81.8	4.6	5.62	2.38	1.19	0.79	1.33	0.96	0.71
169	5.1	82	3	3.66	2.44	1.22	0.81	1.76	1.1	0.78
183	5.1	83.1	1.5	1.81	2.8	1.4	0.93	2.52	1.36	0.92
215	5.1	85.4	4.1	4.8	3.54	1.77	1.18	2.14	1.48	1.08
193	5	87	0.05	0.06	4.05	2.03	1.35	4.05	2.03	1.35
40	5.1	89.5	5.3	5.92	4.85	2.43	1.62	2.46	1.85	1.41
186	5.1	91.9	2.3	2.5	5.63	2.81	1.88	4.52	2.64	1.82
55	5.2	91.9	3.483	3.79	5.63	2.81	1.88	3.75	2.45	1.76
149	5	93.5	0.46	0.49	6.14	3.07	2.05	6.07	3.06	2.04
194	5.1	94.3	2.21	2.34	6.4	3.2	2.13	5.21	3.01	2.07
178	5.1	96	3.75	3.91	6.94	3.47	2.31	4.43	2.97	2.15
Cs (3.73 ± 0.489) [mg/kg]										
192	5.2	3.408	0.126	3.7	-1.32	-0.66	-0.44	1.17	0.64	0.43
184	5	3.5	0.12	3.43	-0.94	-0.47	-0.31	0.84	0.46	0.31
178	5.1	3.52	0.14	3.98	-0.86	-0.43	-0.29	0.74	0.41	0.28
215	5.1	3.52	0.13	3.69	-0.86	-0.43	-0.29	0.76	0.41	0.28
199	5.1	3.54	0.3	8.47	-0.78	-0.39	-0.26	0.49	0.33	0.24
172	5.1	3.57	0.15	4.2	-0.65	-0.33	-0.22	0.56	0.31	0.21
61	5.2	3.58	0.19	5.31	-0.61	-0.31	-0.2	0.48	0.29	0.2
170	5	3.593	0.365	10.16	-0.56	-0.28	-0.19	0.31	0.22	0.17
222	5.1	3.61	0.15	4.16	-0.49	-0.25	-0.16	0.42	0.23	0.16
176	5	3.64	0.06	1.65	-0.37	-0.18	-0.12	0.36	0.18	0.12
169	5.1	3.65	0.13	3.56	-0.33	-0.16	-0.11	0.29	0.16	0.11
195	5	3.653	0.21	5.75	-0.31	-0.16	-0.1	0.24	0.14	0.1
55	5.2	3.66	0.245	6.69	-0.29	-0.14	-0.1	0.2	0.13	0.09
224	5	3.69	0.06	1.63	-0.16	-0.08	-0.05	0.16	0.08	0.05
203	5	3.7	0.17	4.59	-0.12	-0.06	-0.04	0.1	0.06	0.04
194	5.1	3.75	0.18	4.8	0.08	0.04	0.03	0.07	0.04	0.03
152	5.2	3.83	0.09	2.35	0.41	0.2	0.14	0.38	0.2	0.14
214	5	3.83	0.049	1.28	0.41	0.2	0.14	0.4	0.2	0.14
183	5.1	3.84	0.07	1.82	0.45	0.22	0.15	0.43	0.22	0.15
198	5.1	3.84	0.14	3.65	0.45	0.22	0.15	0.39	0.22	0.15
175	5.2	3.914	0.136	3.47	0.75	0.38	0.25	0.66	0.36	0.25
193	5	4	0.01	0.25	1.1	0.55	0.37	1.1	0.55	0.37
186	5.1	4.3*	0.15	3.49	2.33	1.16	0.78	1.99	1.11	0.76
213	5.2	5.2*	0.7	13.46	6.01	3	2	1.98	1.72	1.45
40	5.1	5.6*	0.4	7.14	7.64	3.82	2.55	3.99	2.96	2.24
Dy (3.76 ± 0.493) [mg/kg]										
215	5.1	3.68	0.39	10.6	-0.32	-0.16	-0.11	0.17	0.13	0.1

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
55	5.2	3.73	0.4	10.72	-0.12	-0.06	-0.04	0.06	0.05	0.04
224	5	3.76	0.23	6.12	0	0	0	0	0	0
175	5.2	3.823	0.083	2.17	0.26	0.13	0.09	0.24	0.13	0.08
176	5	3.9	0.23	5.9	0.57	0.28	0.19	0.42	0.26	0.18
152	5.2	4.34*	0.13	3	2.35	1.18	0.78	2.08	1.14	0.77
Eu (1.079 ± 0.171) [mg/kg]										
199	5.1	0.92	0.05	5.43	-1.86	-0.93	-0.62	1.61	0.89	0.61
192	5.2	0.931	0.033	3.54	-1.73	-0.87	-0.58	1.62	0.85	0.57
184	5	0.95	0.04	4.21	-1.51	-0.76	-0.5	1.37	0.74	0.5
178	5.1	0.96	0.04	4.17	-1.39	-0.7	-0.46	1.26	0.68	0.46
61	5.2	0.962	0.047	4.89	-1.37	-0.69	-0.46	1.2	0.66	0.45
169	5.1	0.973	0.048	4.93	-1.24	-0.62	-0.41	1.08	0.6	0.41
172	5.1	0.991	0.041	4.14	-1.03	-0.52	-0.34	0.93	0.5	0.34
194	5.1	0.995	0.005	0.5	-0.98	-0.49	-0.33	0.98	0.49	0.33
215	5.1	0.996	0.046	4.62	-0.97	-0.49	-0.32	0.86	0.47	0.32
224	5	1.029	0.017	1.65	-0.59	-0.29	-0.2	0.57	0.29	0.19
176	5	1.036	0.017	1.64	-0.5	-0.25	-0.17	0.49	0.25	0.17
152	5.2	1.05	0.04	3.81	-0.34	-0.17	-0.11	0.31	0.17	0.11
214	5	1.05	0.012	1.14	-0.34	-0.17	-0.11	0.34	0.17	0.11
175	5.2	1.054	0.079	7.5	-0.29	-0.15	-0.1	0.22	0.13	0.09
139	10	1.06	0.1	9.43	-0.22	-0.11	-0.07	0.14	0.1	0.07
186	5.1	1.06	0.03	2.83	-0.22	-0.11	-0.07	0.21	0.11	0.07
183	5.1	1.07	0.02	1.87	-0.11	-0.05	-0.04	0.1	0.05	0.04
193	5	1.1	0.01	0.91	0.25	0.12	0.08	0.24	0.12	0.08
198	5.1	1.13	0.04	3.54	0.6	0.3	0.2	0.54	0.29	0.2
55	5.2	1.14	0.18	15.79	0.71	0.36	0.24	0.31	0.25	0.19
203	5	1.2	0.088	7.33	1.42	0.71	0.47	0.99	0.63	0.45
170	5	1.257*	0.11	8.75	2.09	1.04	0.7	1.28	0.88	0.64
40	5.1	1.4*	0.1	7.14	3.76	1.88	1.25	2.44	1.62	1.17
Ga [mg/kg]										
172	5.1	19.1	3.3	17.28	-	-	-	-	-	-
Gd [mg/kg]										
211	5.2	0.218*	0.014	6.42	-	-	-	-	-	-
192	5.2	4.42	0.28	6.33	-	-	-	-	-	-
215	5.1	4.97	0.31	6.24	-	-	-	-	-	-
183	5.4	5.3	0.371	7	-	-	-	-	-	-
178	5.1	7.66*	1.66	21.67	-	-	-	-	-	-
Hf (6.2 ± 0.754) [mg/kg]										
199	5.1	5.25	0.34	6.48	-2.52	-1.26	-0.84	1.87	1.15	0.8
55	5.2	5.38	0.172	3.2	-2.18	-1.09	-0.73	1.98	1.06	0.72
175	5.2	5.517	0.224	4.06	-1.81	-0.91	-0.6	1.56	0.87	0.59
170	5	5.61	0.441	7.86	-1.57	-0.78	-0.52	1.02	0.68	0.49
61	5.2	5.63	0.73	12.97	-1.51	-0.76	-0.5	0.69	0.54	0.42
152	5.2	5.83	0.31	5.32	-0.98	-0.49	-0.33	0.76	0.45	0.32
192	5.2	5.973	0.3	5.02	-0.6	-0.3	-0.2	0.47	0.28	0.19
193	5	6	0.01	0.17	-0.53	-0.27	-0.18	0.53	0.27	0.18
176	5	6.09	0.1	1.64	-0.29	-0.15	-0.1	0.28	0.14	0.1

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
139	10	6.14	0.36	5.86	-0.16	-0.08	-0.05	0.12	0.07	0.05
224	5	6.14	0.1	1.63	-0.16	-0.08	-0.05	0.15	0.08	0.05
186	5.1	6.2	0.14	2.26	0	0	0	0	0	0
184	5	6.2	0.2	3.23	0	0	0	0	0	0
172	5.1	6.23	0.25	4.01	0.08	0.04	0.03	0.07	0.04	0.03
198	5.1	6.25	0.28	4.48	0.13	0.07	0.04	0.11	0.06	0.04
194	5.1	6.27	0.33	5.26	0.19	0.09	0.06	0.14	0.09	0.06
214	5	6.3	0.169	2.68	0.27	0.13	0.09	0.24	0.13	0.09
222	5.1	6.35	0.26	4.09	0.4	0.2	0.13	0.33	0.19	0.13
195	5	6.395	0.85	13.29	0.52	0.26	0.17	0.21	0.17	0.14
215	5.1	6.4	1.9	29.69	0.53	0.27	0.18	0.1	0.1	0.09
40	5.1	6.4	0.4	6.25	0.53	0.27	0.18	0.36	0.23	0.17
169	5.1	6.41	0.25	3.9	0.56	0.28	0.19	0.46	0.26	0.18
178	5.1	6.5	0.23	3.54	0.8	0.4	0.27	0.68	0.38	0.26
183	5.1	7.02	0.13	1.85	2.18	1.09	0.73	2.06	1.07	0.72
Hg [mg/kg]										
203	5	0.76	0.087	11.45	-	-	-	-	-	-
Ho [mg/kg]										
192	5.2	0.698	0.074	10.6	-	-	-	-	-	-
I [mg/kg]										
172	5.1	121	5	4.13	-	-	-	-	-	-
222	5.1	121	5	4.13	-	-	-	-	-	-
199	5.1	126	9	7.14	-	-	-	-	-	-
215	5.1	134.7*	4.7	3.49	-	-	-	-	-	-
178	5.1	156*	14.8	9.49	-	-	-	-	-	-
In [mg/kg]										
172	5.1	0.158	0.038	24.05	-	-	-	-	-	-
222	5.1	0.163	0.043	26.38	-	-	-	-	-	-
La (30.2 ± 2.893) [mg/kg]										
213	5.2	16.3*	1.6	9.82	-9.61	-4.81	-3.2	6.44	4.2	3.01
178	5.1	26.2	0.8	3.05	-2.77	-1.38	-0.92	2.42	1.33	0.91
149	5	26.2	1.36	5.19	-2.77	-1.38	-0.92	2.01	1.25	0.88
192	5.2	27.72	1	3.61	-1.71	-0.86	-0.57	1.41	0.81	0.56
76	5	28.16	2	7.1	-1.41	-0.71	-0.47	0.83	0.58	0.43
222	5.1	28.8	1.2	4.17	-0.97	-0.48	-0.32	0.74	0.45	0.31
172	5.1	28.9	1.2	4.15	-0.9	-0.45	-0.3	0.69	0.42	0.29
203	5	29.2	1.05	3.6	-0.69	-0.35	-0.23	0.56	0.32	0.22
211	5.2	29.848	1.289	4.32	-0.24	-0.12	-0.08	0.18	0.11	0.08
40	5.1	30	1.7	5.67	-0.14	-0.07	-0.05	0.09	0.06	0.04
152	5.2	30.1	1.1	3.65	-0.07	-0.03	-0.02	0.06	0.03	0.02
186	5.1	30.12	5.37	17.83	-0.06	-0.03	-0.02	0.01	0.01	0.01
215	5.1	30.2	1.9	6.29	0	0	0	0	0	0
193	5	30.5	0.06	0.2	0.21	0.1	0.07	0.21	0.1	0.07
176	5	30.6	0.5	1.63	0.28	0.14	0.09	0.26	0.14	0.09
198	5.1	30.9	1.1	3.56	0.48	0.24	0.16	0.39	0.23	0.16

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
169	5.1	30.9	1.2	3.88	0.48	0.24	0.16	0.37	0.22	0.16
224	5	30.9	0.5	1.62	0.48	0.24	0.16	0.46	0.24	0.16
199	5.1	30.94	0.57	1.84	0.51	0.26	0.17	0.48	0.25	0.17
214	5	31.1	0.899	2.89	0.62	0.31	0.21	0.53	0.3	0.2
170	5	31.133	0.596	1.91	0.65	0.32	0.22	0.6	0.32	0.21
184	5	31.4	1	3.18	0.83	0.41	0.28	0.68	0.39	0.27
194	5.1	31.5	0.707	2.24	0.9	0.45	0.3	0.81	0.44	0.3
61	5.2	32.79	0.7	2.13	1.79	0.9	0.6	1.61	0.87	0.59
175	5.2	33.06	1.3	3.93	1.98	0.99	0.66	1.47	0.9	0.63
55	5.2	33.85	0.846	2.5	2.52	1.26	0.84	2.18	1.21	0.83
195	5	34.386	2.4	6.98	2.89	1.45	0.96	1.49	1.11	0.84
				Lu (0.33 ± 0.062) [mg/kg]						
178	5.1	0.28	0.14	50	-1.6	-0.8	-0.53	0.35	0.33	0.3
199	5.1	0.29	0.07	24.14	-1.28	-0.64	-0.43	0.52	0.43	0.34
192	5.2	0.296	0.015	5.07	-1.09	-0.55	-0.36	0.98	0.53	0.36
184	5	0.3	0.02	6.67	-0.96	-0.48	-0.32	0.81	0.46	0.31
172	5.1	0.304	0.022	7.24	-0.83	-0.42	-0.28	0.68	0.39	0.27
61	5.2	0.321	0.05	15.58	-0.29	-0.14	-0.1	0.15	0.11	0.08
224	5	0.327	0.009	2.75	-0.1	-0.05	-0.03	0.09	0.05	0.03
215	5.1	0.328	0.015	4.57	-0.06	-0.03	-0.02	0.06	0.03	0.02
183	5.1	0.33	0.02	6.06	0	0	0	0	0	0
186	5.1	0.33	0.04	12.12	0	0	0	0	0	0
176	5	0.336	0.009	2.68	0.19	0.1	0.06	0.18	0.1	0.06
214	5	0.34	0.008	2.35	0.32	0.16	0.11	0.31	0.16	0.11
175	5.2	0.354	0.024	6.78	0.77	0.38	0.26	0.61	0.36	0.25
152	5.2	0.36	0.01	2.78	0.96	0.48	0.32	0.92	0.47	0.32
40	5.1	0.39	0.03	7.69	1.92	0.96	0.64	1.39	0.87	0.61
213	5.2	0.4	0.02	5	2.24	1.12	0.75	1.89	1.07	0.73
195	5	0.429	0.05	11.66	3.17	1.59	1.06	1.68	1.24	0.93
				Mn (356 ± 23.523) [mg/kg]						
149	10	193.2*	2.85	1.48	-13.84	-6.92	-4.61	13.45	6.87	4.6
222	5.1	351	14	3.99	-0.43	-0.21	-0.14	0.27	0.18	0.13
213	5.2	355	12	3.38	-0.09	-0.04	-0.03	0.06	0.04	0.03
172	5.1	356	14	3.93	0	0	0	0	0	0
182	5.1	363.2	13.08	3.6	0.61	0.31	0.2	0.41	0.27	0.19
152	5.2	364	27	7.42	0.68	0.34	0.23	0.27	0.22	0.18
178	5.1	365	12.3	3.37	0.77	0.38	0.26	0.53	0.34	0.24
195	5	365.123	6	1.64	0.78	0.39	0.26	0.69	0.38	0.25
215	5.1	367	13	3.54	0.94	0.47	0.31	0.63	0.41	0.29
199	5.1	368	7	1.9	1.02	0.51	0.34	0.88	0.49	0.33
55	5.2	374.66	4.9	1.31	1.59	0.79	0.53	1.46	0.78	0.52
193	5	376	0.1	0.03	1.7	0.85	0.57	1.7	0.85	0.57
176	5	379	7	1.85	1.96	0.98	0.65	1.68	0.94	0.64
224	5	380	7	1.84	2.04	1.02	0.68	1.75	0.98	0.67
175	5.2	385.6	17.6	4.56	2.52	1.26	0.84	1.4	1.01	0.75
76	5	386.22	26	6.73	2.57	1.28	0.86	1.06	0.86	0.69
186	5.1	400	15.1	3.78	3.74	1.87	1.25	2.3	1.57	1.15
223	10	400	30	7.5	3.74	1.87	1.25	1.37	1.15	0.95
211	5.2	423.911*	26.109	6.16	5.77	2.89	1.92	2.37	1.93	1.55

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
183	5.4	500*	20	4	12.24	6.12	4.08	6.21	4.66	3.55
84	5.2	650*	10	1.54	25	12.5	8.33	19.04	11.5	8.02
				Mo [mg/kg]						
222	5.1	5.17	1.03	19.92	-	-	-	-	-	-
169	5.1	5.4	0.9	16.67	-	-	-	-	-	-
198	5.1	5.74	0.32	5.57	-	-	-	-	-	-
172	5.1	6.19	1.91	30.86	-	-	-	-	-	-
178	5.1	8.24*	1.26	15.29	-	-	-	-	-	-
				Nb [mg/kg]						
223	10	15.2	2.3	15.13	-	-	-	-	-	-
				Nd (26.31 ± 2.573) [mg/kg]						
192	5.2	23	0.95	4.13	-2.57	-1.29	-0.86	2.07	1.21	0.83
175	5.2	25.4	3.01	11.85	-0.71	-0.35	-0.24	0.28	0.23	0.19
172	5.1	25.5	1.1	4.31	-0.63	-0.31	-0.21	0.48	0.29	0.2
176	5	25.6	0.5	1.95	-0.55	-0.28	-0.18	0.51	0.27	0.18
224	5	25.6	0.5	1.95	-0.55	-0.28	-0.18	0.51	0.27	0.18
40	5.1	25.7	6	23.35	-0.47	-0.24	-0.16	0.1	0.09	0.09
199	5.1	26.31	4.74	18.02	0	0	0	0	0	0
183	5.1	27.6	1	3.62	1	0.5	0.33	0.79	0.47	0.32
61	5.1	28.3	2.5	8.83	1.55	0.77	0.52	0.71	0.55	0.43
215	5.1	28.3	3.5	12.37	1.55	0.77	0.52	0.53	0.46	0.38
169	5.1	28.5	1	3.51	1.7	0.85	0.57	1.34	0.79	0.55
178	5.1	28.8	6.1	21.18	1.94	0.97	0.65	0.4	0.38	0.34
198	5.1	29.3	1.2	4.1	2.32	1.16	0.77	1.7	1.05	0.74
194	5.1	34.4*	1.08	3.14	6.29	3.14	2.1	4.82	2.9	2.02
152	5.2	39.1*	2.7	6.91	9.94	4.97	3.31	4.28	3.43	2.72
203	5	108.6*	17.17	15.81	63.97	31.98	21.32	4.78	4.74	4.68
				Ni (30.3 ± 2.901) [mg/kg]						
203	5	30.1	4.31	14.32	-0.14	-0.07	-0.05	0.04	0.04	0.03
172	5.1	30.3	3.6	11.88	0	0	0	0	0	0
223	10	41*	2.5	6.1	7.38	3.69	2.46	3.7	2.79	2.13
				Pr [mg/kg]						
172	5.1	5.08	2.44	48.03	-	-	-	-	-	-
				Rb (82 ± 6.758) [mg/kg]						
211	5.2	40.6*	17.875	44.03	-12.25	-6.13	-4.08	2.28	2.17	2.01
192	5.2	76.8	3.4	4.43	-1.54	-0.77	-0.51	1.08	0.69	0.49
184	5	78.5	3.5	4.46	-1.04	-0.52	-0.35	0.72	0.46	0.33
199	5.1	78.98	1.99	2.52	-0.89	-0.45	-0.3	0.77	0.43	0.29
203	5	79	7.64	9.67	-0.89	-0.44	-0.3	0.36	0.29	0.24
172	5.1	83.6	3.4	4.07	0.47	0.24	0.16	0.33	0.21	0.15
198	5.1	86.6	3.2	3.7	1.36	0.68	0.45	0.99	0.62	0.43
223	10	86.8	4.9	5.65	1.42	0.71	0.47	0.81	0.58	0.43
222	5.1	87.1	3.6	4.13	1.51	0.75	0.5	1.03	0.67	0.47
193	5	88	0.1	0.11	1.78	0.89	0.59	1.77	0.89	0.59

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
214	5	88.1	1.284	1.46	1.81	0.9	0.6	1.69	0.89	0.6
152	5.2	88.2	3.9	4.42	1.83	0.92	0.61	1.2	0.79	0.57
215	5.1	89.2	3.1	3.48	2.13	1.07	0.71	1.57	0.97	0.68
176	5	89.4	1.7	1.9	2.19	1.1	0.73	1.96	1.06	0.72
224	5	90	1.7	1.89	2.37	1.18	0.79	2.11	1.15	0.78
169	5.1	91.3	6.3	6.9	2.75	1.38	0.92	1.3	1.01	0.78
183	5.1	92.9	1.8	1.94	3.23	1.61	1.08	2.85	1.56	1.06
194	5.1	94.8	2.32	2.45	3.79	1.89	1.26	3.12	1.79	1.23
61	5.2	96	12	12.5	4.14	2.07	1.38	1.12	1.02	0.89
175	5.2	96.13	2.7	2.81	4.18	2.09	1.39	3.27	1.94	1.35
40	5.1	98	7	7.14	4.74	2.37	1.58	2.06	1.64	1.3
178	5.1	98.1	4.08	4.16	4.76	2.38	1.59	3.04	2.04	1.47
186	5.1	101.9	3.29	3.23	5.89	2.94	1.96	4.22	2.65	1.87
Ru [mg/kg]										
172	5.1	22.2	0.9	4.05	-	-	-	-	-	-
222	5.1	22.5	0.9	4	-	-	-	-	-	-
S [mg/kg]										
183	5.4	7700	0.023	0	-	-	-	-	-	-
Sb (1.34 ± 0.205) [mg/kg]										
211	5.2	1.028	0.08	7.78	-3.04	-1.52	-1.01	2.4	1.42	0.98
178	5.1	1.06	0.05	4.72	-2.73	-1.37	-0.91	2.45	1.33	0.9
184	5	1.21	0.07	5.79	-1.27	-0.63	-0.42	1.05	0.6	0.41
169	5.1	1.31	0.09	6.87	-0.29	-0.15	-0.1	0.22	0.13	0.09
172	5.1	1.37	0.06	4.38	0.29	0.15	0.1	0.25	0.14	0.1
215	5.1	1.4	0.8	57.14	0.59	0.29	0.2	0.07	0.07	0.07
176	5	1.41	0.04	2.84	0.68	0.34	0.23	0.64	0.33	0.23
222	5.1	1.43	0.08	5.59	0.88	0.44	0.29	0.69	0.41	0.28
199	5.1	1.45	0.17	11.72	1.07	0.54	0.36	0.55	0.41	0.31
61	5.2	1.46	0.15	10.27	1.17	0.59	0.39	0.66	0.47	0.35
175	5.2	1.587	0.162	10.21	2.41	1.2	0.8	1.29	0.94	0.71
203	5	1.6	0.12	7.5	2.54	1.27	0.85	1.65	1.09	0.79
224	5	1.64	0.04	2.44	2.93	1.46	0.98	2.73	1.44	0.97
214	5	1.64	0.047	2.87	2.93	1.46	0.98	2.66	1.43	0.96
192	5.2	1.68	0.068	4.05	3.32	1.66	1.11	2.76	1.57	1.08
183	5.1	1.82	0.04	2.2	4.68	2.34	1.56	4.36	2.3	1.55
193	5	1.9	0.1	5.26	5.46	2.73	1.82	3.91	2.45	1.73
170	5	1.932	0.361	18.69	5.77	2.89	1.92	1.58	1.43	1.25
40	5.1	2	0.3	15	6.44	3.22	2.15	2.08	1.82	1.54
186	5.1	2.08	0.1	4.81	7.22	3.61	2.41	5.17	3.24	2.29
Sc (8.39 ± 0.974) [mg/kg]										
76	5	6.03*	0.4	6.63	-4.84	-2.42	-1.61	3.74	2.24	1.56
203	5	7.6	1.13	14.87	-1.62	-0.81	-0.54	0.64	0.53	0.43
192	5.2	7.9	0.274	3.47	-1.01	-0.5	-0.34	0.88	0.48	0.33
222	5.1	7.91	0.33	4.17	-0.99	-0.49	-0.33	0.82	0.47	0.32
55	5.2	8.01	0.016	0.2	-0.78	-0.39	-0.26	0.78	0.39	0.26
172	5.1	8.02	0.32	3.99	-0.76	-0.38	-0.25	0.63	0.36	0.25
170	5	8.028	0.063	0.78	-0.74	-0.37	-0.25	0.74	0.37	0.25

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	k = 1.0	k = 1.5	k = 0.5	k = 1.0	k = 1.5
176	5	8.1	0.12	1.48	-0.6	-0.3	-0.2	0.58	0.3	0.2
224	5	8.12	0.12	1.48	-0.55	-0.28	-0.18	0.54	0.27	0.18
211	5.2	8.177	0.259	3.17	-0.44	-0.22	-0.15	0.39	0.21	0.14
213	5.2	8.2	0.2	2.44	-0.39	-0.19	-0.13	0.36	0.19	0.13
193	5	8.2	0.004	0.05	-0.39	-0.19	-0.13	0.39	0.19	0.13
184	5	8.31	0.19	2.29	-0.16	-0.08	-0.05	0.15	0.08	0.05
199	5.1	8.32	0.2	2.4	-0.14	-0.07	-0.05	0.13	0.07	0.05
215	5.1	8.39	0.26	3.1	0	0	0	0	0	0
61	5.1	8.42	0.28	3.33	0.06	0.03	0.02	0.05	0.03	0.02
214	5	8.42	0.093	1.1	0.06	0.03	0.02	0.06	0.03	0.02
169	5.1	8.47	0.31	3.66	0.16	0.08	0.05	0.14	0.08	0.05
152	5.2	8.47	0.18	2.13	0.16	0.08	0.05	0.15	0.08	0.05
40	5.1	8.5	0.5	5.88	0.23	0.11	0.08	0.16	0.1	0.07
183	5.1	8.65	0.16	1.85	0.53	0.27	0.18	0.51	0.26	0.18
175	5.2	8.654	0.203	2.35	0.54	0.27	0.18	0.5	0.27	0.18
186	5.1	8.66	0.21	2.42	0.55	0.28	0.18	0.51	0.27	0.18
198	5.1	8.72	0.35	4.01	0.68	0.34	0.23	0.55	0.32	0.22
194	5.1	8.73	0.109	1.25	0.7	0.35	0.23	0.68	0.35	0.23
178	5.1	8.83	0.25	2.83	0.9	0.45	0.3	0.8	0.44	0.3
195	5	8.943	0.22	2.46	1.13	0.57	0.38	1.03	0.55	0.37
139	10	8.95	0.53	5.92	1.15	0.57	0.38	0.78	0.5	0.36
					Se [mg/kg]					
203	5	0.305	0.044	14.43	-	-	-	-	-	-
224	5	0.7	0.09	12.86	-	-	-	-	-	-
149	5	1.06	0.07	6.6	-	-	-	-	-	-
192	5.2	1.138	0.084	7.38	-	-	-	-	-	-
					Si [mg/kg]					
172	5.1	234150	31945	13.64	-	-	-	-	-	-
222	5.1	252933	31250	12.36	-	-	-	-	-	-
183	5.4	260000	4160	1.6	-	-	-	-	-	-
					Sm (4.94 ± 0.621) [mg/kg]					
211	5.2	0.056*	0.009	16.07	-15.72	-7.86	-5.24	15.71	7.86	5.24
178	5.1	4.04	0.12	2.97	-2.9	-1.45	-0.97	2.7	1.42	0.96
199	5.1	4.43	0.7	15.8	-1.64	-0.82	-0.55	0.67	0.54	0.44
149	5	4.43	0.06	1.35	-1.64	-0.82	-0.55	1.61	0.82	0.55
192	5.2	4.55	0.18	3.96	-1.26	-0.63	-0.42	1.09	0.6	0.41
172	5.1	4.64	0.19	4.09	-0.97	-0.48	-0.32	0.82	0.46	0.32
183	5.1	4.64	0.19	4.09	-0.97	-0.48	-0.32	0.82	0.46	0.32
40	5.1	4.7	0.4	8.51	-0.77	-0.39	-0.26	0.47	0.32	0.24
169	5.1	4.73	0.17	3.59	-0.68	-0.34	-0.23	0.59	0.33	0.22
55	5.2	4.78	0.057	1.19	-0.51	-0.26	-0.17	0.51	0.26	0.17
61	5.2	4.85	0.5	10.31	-0.29	-0.14	-0.1	0.15	0.11	0.09
176	5	4.87	0.08	1.64	-0.23	-0.11	-0.08	0.22	0.11	0.07
203	5	4.9	0.38	7.76	-0.13	-0.06	-0.04	0.08	0.05	0.04
224	5	4.95	0.08	1.62	0.03	0.02	0.01	0.03	0.02	0.01
193	5	4.95	0.01	0.2	0.03	0.02	0.01	0.03	0.02	0.01
215	5.1	4.96	0.19	3.83	0.06	0.03	0.02	0.05	0.03	0.02

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
194	5.1	5	0.221	4.42	0.19	0.1	0.06	0.16	0.09	0.06
214	5	5.04	0.104	2.06	0.32	0.16	0.11	0.31	0.16	0.11
198	5.1	5.12	0.18	3.52	0.58	0.29	0.19	0.5	0.28	0.19
152	5.2	5.17	0.49	9.48	0.74	0.37	0.25	0.4	0.29	0.22
184	5	5.3	0.17	3.21	1.16	0.58	0.39	1.02	0.56	0.38
175	5.2	5.355	0.324	6.05	1.34	0.67	0.45	0.92	0.59	0.42
195	5	5.378	0.7	13.02	1.41	0.7	0.47	0.57	0.47	0.38
				Sr (473 ± 29.945) [mg/kg]						
203	5	400	16.27	4.07	-4.88	-2.44	-1.63	3.3	2.14	1.53
192	5.2	417	17	4.08	-3.74	-1.87	-1.25	2.47	1.63	1.17
61	5.1	441	42	9.52	-2.14	-1.07	-0.71	0.72	0.62	0.52
193	5	451	0.16	0.04	-1.47	-0.73	-0.49	1.47	0.73	0.49
176	5	453	10	2.21	-1.34	-0.67	-0.45	1.11	0.63	0.43
199	5.1	482	48	9.96	0.6	0.3	0.2	0.18	0.16	0.14
215	5.1	488	19	3.89	1	0.5	0.33	0.62	0.42	0.31
198	5.1	495	19	3.84	1.47	0.73	0.49	0.91	0.62	0.45
172	5.1	499	21	4.21	1.74	0.87	0.58	1.01	0.71	0.52
169	5.1	500	20	4	1.8	0.9	0.6	1.08	0.75	0.55
224	5	503	10	1.99	2	1	0.67	1.67	0.95	0.65
183	5.1	517	14	2.71	2.94	1.47	0.98	2.15	1.33	0.94
214	5	520	17.699	3.4	3.14	1.57	1.05	2.03	1.35	0.97
223	10	536	88	16.42	4.21	2.1	1.4	0.71	0.68	0.64
175	5.2	555.3	32.3	5.82	5.5	2.75	1.83	2.31	1.87	1.49
40	5.1	570	66	11.58	6.48	3.24	2.16	1.43	1.34	1.22
178	5.1	590	45.5	7.71	7.81	3.91	2.6	2.44	2.15	1.83
				Ta (0.91 ± 0.148) [mg/kg]						
193	5	0.77	0.01	1.3	-1.9	-0.95	-0.63	1.88	0.95	0.63
192	5.2	0.775	0.037	4.77	-1.83	-0.91	-0.61	1.63	0.89	0.6
40	5.1	0.8	0.1	12.5	-1.49	-0.75	-0.5	0.88	0.62	0.45
224	5	0.829	0.016	1.93	-1.1	-0.55	-0.37	1.07	0.55	0.36
176	5	0.837	0.016	1.91	-0.99	-0.49	-0.33	0.97	0.49	0.33
61	5.2	0.88	0.14	15.91	-0.41	-0.2	-0.14	0.19	0.15	0.11
199	5.1	0.89	0.05	5.62	-0.27	-0.14	-0.09	0.22	0.13	0.09
172	5.1	0.89	0.039	4.38	-0.27	-0.14	-0.09	0.24	0.13	0.09
215	5.1	0.91	0.2	21.98	0	0	0	0	0	0
178	5.1	0.93	0.06	6.45	0.27	0.14	0.09	0.21	0.13	0.09
198	5.1	0.94	0.046	4.89	0.41	0.2	0.14	0.34	0.19	0.13
169	5.1	0.944	0.065	6.89	0.46	0.23	0.15	0.35	0.21	0.15
175	5.2	0.968	0.056	5.79	0.79	0.39	0.26	0.63	0.37	0.25
214	5	1.01	0.012	1.19	1.35	0.68	0.45	1.34	0.68	0.45
184	5	1.02	0.06	5.88	1.49	0.75	0.5	1.16	0.69	0.48
183	5.1	1.08	0.02	1.85	2.3	1.15	0.77	2.22	1.14	0.76
194	5.1	1.11	0.087	7.84	2.71	1.35	0.9	1.75	1.17	0.84
152	5.2	1.47*	0.09	6.12	7.59	3.79	2.53	4.81	3.24	2.34
76	5	13.61*	0.6	4.41	172.03	86.01	57.34	21.01	20.55	19.86
				Tb (0.63 ± 0.108) [mg/kg]						
40	5.1	0.55	0.08	14.55	-1.48	-0.74	-0.49	0.83	0.6	0.44
184	5	0.55	0.03	5.45	-1.48	-0.74	-0.49	1.29	0.71	0.49

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
61	5.2	0.567	0.084	14.81	-1.17	-0.58	-0.39	0.63	0.46	0.35
224	5	0.579	0.013	2.25	-0.94	-0.47	-0.31	0.92	0.47	0.31
178	5.1	0.58	0.06	10.34	-0.93	-0.46	-0.31	0.62	0.4	0.29
176	5	0.59	0.013	2.2	-0.74	-0.37	-0.25	0.72	0.37	0.25
194	5.1	0.594	0.038	6.4	-0.67	-0.33	-0.22	0.55	0.31	0.22
199	5.1	0.6	0.06	10	-0.56	-0.28	-0.19	0.37	0.24	0.17
169	5.1	0.608	0.024	3.95	-0.41	-0.2	-0.14	0.37	0.2	0.13
192	5.2	0.611	0.025	4.09	-0.35	-0.18	-0.12	0.32	0.17	0.12
193	5	0.62	0.006	0.97	-0.19	-0.09	-0.06	0.18	0.09	0.06
215	5.1	0.62	0.06	9.68	-0.19	-0.09	-0.06	0.12	0.08	0.06
198	5.1	0.644	0.03	4.66	0.26	0.13	0.09	0.23	0.12	0.08
183	5.1	0.65	0.01	1.54	0.37	0.19	0.12	0.36	0.18	0.12
214	5	0.67	0.02	2.99	0.74	0.37	0.25	0.69	0.36	0.24
152	5.2	2.49*	0.23	9.24	34.43	17.22	11.48	7.87	7.32	6.61
				Th (8.71 ± 1.006) [mg/kg]						
76	5	7.29	0.6	8.23	-2.82	-1.41	-0.94	1.81	1.21	0.87
152	5.2	7.46	0.55	7.37	-2.49	-1.24	-0.83	1.68	1.09	0.78
170	5	7.617	0.49	6.43	-2.17	-1.09	-0.72	1.56	0.98	0.69
199	5.1	7.64	0.29	3.8	-2.13	-1.06	-0.71	1.84	1.02	0.7
192	5.2	7.7	0.29	3.77	-2.01	-1	-0.67	1.74	0.96	0.66
193	5	8.14	0.005	0.06	-1.13	-0.57	-0.38	1.13	0.57	0.38
184	5	8.16	0.25	3.06	-1.09	-0.55	-0.36	0.98	0.53	0.36
215	5.1	8.2	0.8	9.76	-1.01	-0.51	-0.34	0.54	0.4	0.3
169	5.1	8.57	0.3	3.5	-0.28	-0.14	-0.09	0.24	0.13	0.09
40	5.1	8.6	0.5	5.81	-0.22	-0.11	-0.07	0.16	0.1	0.07
172	5.1	8.66	0.35	4.04	-0.1	-0.05	-0.03	0.08	0.05	0.03
203	5	8.7	0.14	1.61	-0.02	-0.01	-0.01	0.02	0.01	0.01
222	5.1	8.71	0.35	4.02	0	0	0	0	0	0
183	5.1	8.71	0.16	1.84	0	0	0	0	0	0
194	5.1	8.75	0.158	1.81	0.08	0.04	0.03	0.08	0.04	0.03
198	5.1	8.91	0.58	6.51	0.4	0.2	0.13	0.26	0.17	0.12
224	5	9.12	0.14	1.54	0.82	0.41	0.27	0.79	0.4	0.27
55	5.2	9.16	0.192	2.1	0.89	0.45	0.3	0.84	0.44	0.3
61	5.2	9.19	0.32	3.48	0.95	0.48	0.32	0.81	0.45	0.31
176	5	9.23	0.14	1.52	1.03	0.52	0.34	1	0.51	0.34
139	10	9.26	0.55	5.94	1.09	0.55	0.36	0.74	0.48	0.34
186	5.1	9.7	0.2	2.06	1.97	0.98	0.66	1.83	0.97	0.65
178	5.1	9.82	0.31	3.16	2.21	1.1	0.74	1.88	1.05	0.72
175	5.2	9.891	0.762	7.7	2.35	1.17	0.78	1.29	0.94	0.7
195	5	10.155	0.8	7.88	2.87	1.44	0.96	1.53	1.12	0.85
				Ti (3530 ± 165.145) [mg/kg]						
172	5.1	3110	187	6.01	-5.09	-2.54	-1.7	2.05	1.68	1.35
222	5.1	3176	195	6.14	-4.29	-2.14	-1.43	1.67	1.39	1.12
55	5.2	3365	320	9.51	-2	-1	-0.67	0.5	0.46	0.41
182	5.1	3368	509	15.11	-1.96	-0.98	-0.65	0.31	0.3	0.29
178	5.1	3450	360	10.43	-0.97	-0.48	-0.32	0.22	0.2	0.18
76	5	3490	510	14.61	-0.48	-0.24	-0.16	0.08	0.07	0.07
215	5.1	3512	185	5.27	-0.22	-0.11	-0.07	0.09	0.07	0.06

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					k = 0.5	*k* = 1.0	*k* = 1.5	*k* = 0.5	*k* = 1.0	*k* = 1.5
152	5.2	3548	69	1.94	0.22	0.11	0.07	0.17	0.1	0.07
224	5	3610	120	3.32	0.97	0.48	0.32	0.55	0.39	0.29
175	5.2	3676	142	3.86	1.77	0.88	0.59	0.89	0.67	0.51
176	5	3700	120	3.24	2.06	1.03	0.69	1.17	0.83	0.62
223	10	3919	207	5.28	4.71	2.36	1.57	1.75	1.47	1.21
199	5.1	4081	235	5.76	6.67	3.34	2.22	2.21	1.92	1.61
183	5.4	4100	94.3	2.3	6.9	3.45	2.3	4.55	3	2.15
211	5.2	10812.309*	1994.494	18.45	88.19	44.1	29.4	3.65	3.64	3.62
Tm [mg/kg]										
203	5	0.14	0.013	9.29	-	-	-	-	-	-
192	5.2	0.306	0.034	11.11	-	-	-	-	-	-
215	5.1	0.343	0.032	9.33	-	-	-	-	-	-
U (2.42 ± 0.339) [mg/kg]										
178	5.1	1.72	0.2	11.63	-4.13	-2.07	-1.38	2.67	1.78	1.28
176	5	1.83	0.06	3.28	-3.48	-1.74	-1.16	3.28	1.71	1.15
184	5	1.87	0.37	19.79	-3.25	-1.62	-1.08	1.35	1.1	0.87
224	5	1.89	0.06	3.17	-3.13	-1.56	-1.04	2.95	1.54	1.04
170	5	1.94	0.37	19.07	-2.83	-1.42	-0.94	1.18	0.96	0.76
199	5.1	2.09	0.49	23.44	-1.95	-0.97	-0.65	0.64	0.55	0.47
222	5.1	2.25	0.21	9.33	-1	-0.5	-0.33	0.63	0.43	0.31
169	5.1	2.27	0.15	6.61	-0.89	-0.44	-0.3	0.66	0.4	0.28
61	5.1	2.28	0.21	9.21	-0.83	-0.41	-0.28	0.52	0.35	0.25
55	5.2	2.3	0.49	21.3	-0.71	-0.35	-0.24	0.23	0.2	0.17
172	5.1	2.35	0.21	8.94	-0.41	-0.21	-0.14	0.26	0.18	0.13
194	5.1	2.38	0.175	7.35	-0.24	-0.12	-0.08	0.16	0.1	0.07
215	5.1	2.5	1	40	0.47	0.24	0.16	0.08	0.08	0.07
203	5	2.5	0.046	1.84	0.47	0.24	0.16	0.46	0.23	0.16
198	5.1	2.57	0.12	4.67	0.89	0.44	0.3	0.72	0.42	0.29
40	5.1	2.6	0.7	26.92	1.06	0.53	0.35	0.25	0.23	0.21
175	5.2	2.783	0.222	7.98	2.14	1.07	0.71	1.3	0.9	0.65
192	5.2	5.2*	0.33	6.35	16.41	8.2	5.47	7.49	5.88	4.59
152	5.2	11.9*	1.3	10.92	55.94	27.97	18.65	7.23	7.06	6.79
V (73 ± 6.122) [mg/kg]										
194	5.1	7.12*	0.25	3.51	-21.52	-10.76	-7.17	21.45	10.75	7.17
211	5.2	32.132*	9.66	30.06	-13.35	-6.68	-4.45	4.03	3.57	3.07
186	5.1	38.5*	0.8	2.08	-11.27	-5.64	-3.76	10.9	5.59	3.74
76	5	65.09	5	7.68	-2.58	-1.29	-0.86	1.35	1	0.76
222	5.1	70.7	3.2	4.53	-0.75	-0.38	-0.25	0.52	0.33	0.24
172	5.1	71.5	3.3	4.62	-0.49	-0.25	-0.16	0.33	0.22	0.15
176	5	75.7	1.7	2.25	0.88	0.44	0.29	0.77	0.42	0.29
224	5	76.6	1.7	2.22	1.18	0.59	0.39	1.03	0.57	0.39
215	5.1	78.3	2.6	3.32	1.73	0.87	0.58	1.32	0.8	0.56
55	5.2	79.56	2.545	3.2	2.14	1.07	0.71	1.65	0.99	0.69
182	5.1	79.6	5.25	6.6	2.16	1.08	0.72	1.09	0.82	0.62
175	5.2	79.62	3.71	4.66	2.16	1.08	0.72	1.38	0.92	0.67
178	5.1	83	4.5	5.42	3.27	1.63	1.09	1.84	1.32	0.98
152	5.2	83.7	6.9	8.24	3.5	1.75	1.17	1.42	1.16	0.93
199	5.1	92	5	5.43	6.21	3.1	2.07	3.24	2.4	1.82

TABLE 3b (cont.). SUMMARY OF THE REPORTED RESULTS AND THE CALCULATED *z*- AND *u*-SCORES FOR THE SILICEOUS MATERIAL

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
				W [mg/kg]						
222	5.1	1.13	0.22	19.47	-	-	-	-	-	-
172	5.1	1.32	0.15	11.36	-	-	-	-	-	-
				Y [mg/kg]						
223	10	17.8	3.3	18.54	-	-	-	-	-	-
				Yb (2.14 ± 0.305) [mg/kg]						
199	5.1	1.75	0.19	10.86	-2.55	-1.28	-0.85	1.6	1.08	0.79
215	5.1	1.91	0.09	4.71	-1.51	-0.75	-0.5	1.3	0.72	0.49
61	5.1	1.98	0.19	9.6	-1.05	-0.52	-0.35	0.66	0.44	0.32
192	5.2	1.98	0.095	4.8	-1.05	-0.52	-0.35	0.89	0.5	0.34
224	5	1.98	0.05	2.53	-1.05	-0.52	-0.35	1	0.52	0.35
172	5.1	2.08	0.15	7.21	-0.39	-0.2	-0.13	0.28	0.18	0.12
176	5	2.08	0.05	2.4	-0.39	-0.2	-0.13	0.37	0.19	0.13
169	5.1	2.08	0.07	3.37	-0.39	-0.2	-0.13	0.36	0.19	0.13
40	5.1	2.2	0.3	13.64	0.39	0.2	0.13	0.18	0.14	0.11
183	5.1	2.25	0.05	2.22	0.72	0.36	0.24	0.68	0.36	0.24
184	5	2.29	0.18	7.86	0.98	0.49	0.33	0.64	0.42	0.3
194	5.1	2.38	0.232	9.75	1.57	0.79	0.52	0.86	0.63	0.47
195	5	2.437	0.2	8.21	1.95	0.97	0.65	1.18	0.81	0.59
175	5.2	2.44	0.167	6.84	1.97	0.98	0.66	1.33	0.86	0.62
178	5.1	2.62	0.64	24.43	3.14	1.57	1.05	0.73	0.68	0.61
152	5.2	2.85	0.31	10.88	4.65	2.33	1.55	2.05	1.63	1.28
203	5	5.6*	0.91	16.25	22.67	11.33	7.56	3.75	3.6	3.4
				Zn (140.6 ± 10.684) [mg/kg]						
211	5.2	61.037*	7.009	11.48	-14.89	-7.45	-4.96	9.03	6.23	4.55
152	5.2	84.9*	3.1	3.65	-10.43	-5.21	-3.48	9.02	5.01	3.41
184	5	130	6	4.62	-1.98	-0.99	-0.66	1.32	0.87	0.62
215	5.1	143	29	20.28	0.45	0.22	0.15	0.08	0.08	0.07
176	5	143.1	2.2	1.54	0.47	0.23	0.16	0.43	0.23	0.15
222	5.1	146	6	4.11	1.01	0.51	0.34	0.67	0.44	0.32
172	5.1	147	6	4.08	1.2	0.6	0.4	0.8	0.52	0.37
198	5.1	150	5	3.33	1.76	0.88	0.59	1.28	0.8	0.56
40	5.1	151	10	6.62	1.95	0.97	0.65	0.92	0.71	0.55
61	5.2	151.8	9.2	6.06	2.1	1.05	0.7	1.05	0.79	0.61
169	5.1	152	8	5.26	2.13	1.07	0.71	1.19	0.85	0.64
192	5.2	152	5.8	3.82	2.13	1.07	0.71	1.45	0.94	0.67
55	5.2	155.67	21.17	13.6	2.82	1.41	0.94	0.69	0.64	0.57
194	5.1	156	16.32	10.46	2.88	1.44	0.96	0.9	0.79	0.67
214	5	156	2.335	1.5	2.88	1.44	0.96	2.64	1.41	0.95
175	5.2	158.2	5.3	3.35	3.29	1.65	1.1	2.34	1.48	1.04
186	5.1	165.05	5.75	3.48	4.58	2.29	1.53	3.12	2.02	1.44
193	5	165.1	0.05	0.03	4.59	2.29	1.53	4.59	2.29	1.53
199	5.1	166	19	11.45	4.75	2.38	1.58	1.29	1.17	1.02
224	5	170	3	1.76	5.5	2.75	1.83	4.8	2.65	1.8
149	5	175.8	1.14	0.65	6.59	3.29	2.2	6.44	3.28	2.19
183	5.1	191*	4	2.09	9.43	4.72	3.14	7.55	4.42	3.05

Laboratory code	Technique code	Analyte concentration	Standard dev.	Relative std. dev., [%]	*z*-scores			*u*-scores		
					$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$
178	5.1	194*	6.69	3.45	10	5	3.33	6.24	4.24	3.07
203	5	425.1*	57.65	13.56	53.26	26.63	17.75	4.91	4.85	4.75
Zr (244.5 ± 17.095) [mg/kg]										
193	5	234.7	0.2	0.09	-1.15	-0.57	-0.38	1.15	0.57	0.38
169	5.1	240	12	5	-0.53	-0.26	-0.18	0.31	0.22	0.16
199	5.1	244	58	23.77	-0.06	-0.03	-0.02	0.01	0.01	0.01
198	5.1	244	13	5.33	-0.06	-0.03	-0.02	0.03	0.02	0.02
175	5.2	244.5	15.6	6.38	0	0	0	0	0	0
223	10	259	21	8.11	1.7	0.85	0.57	0.64	0.54	0.44
215	5.1	261	66	25.29	1.93	0.97	0.64	0.25	0.24	0.23
192	5.2	265	15	5.66	2.4	1.2	0.8	1.19	0.9	0.69
172	5.1	278	19	6.83	3.92	1.96	1.31	1.61	1.31	1.05
183	5.1	305*	11	3.61	7.08	3.54	2.36	4.34	2.98	2.17
40	5.1	657*	95	14.46	48.26	24.13	16.09	4.32	4.27	4.19
152	5.2	1038*	114	10.98	92.83	46.42	30.94	6.94	6.88	6.79

TABLE 4a. THE COMBINED *z*-SCORES FOR THE PARTICIPATING LABORATORIES FOR THE LAND-PLANT MATERIAL

Lab Code	Number of analytes	Rescaled sum of scores (RSZ)			Sum of squared scores (SSZ)			Critical value
		$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$	χ^2
40	16	2.49	1.24	0.83	183	45.85	20.38	28.85
55	19	63.94	31.97	21.31	16847	4212	1872	32.85
61	15	-4.47	-2.23	-1.49	116	28.97	12.88	27.49
76	8	11162	5581	3721	952724001	238181000	105858222	17.53
84	0	0	0	0	0	0	0	0
139	2	61.02	30.51	20.34	7291	1823	810	7.38
149	9	20.11	10.05	6.7	1685	421	187	19.02
152	17	4.58	2.29	1.53	1681	420	187	30.19
169	8	-0.64	-0.32	-0.21	17.93	4.48	1.99	17.53
170	11	17.89	8.95	5.96	889	222	98.77	21.92
172	16	22.91	11.46	7.64	8975	2244	997	28.85
175	3	19.47	9.74	6.49	949	237	105	9.35
176	14	0.64	0.32	0.21	84.47	21.12	9.39	26.12
178	14	320	160	107	591983	147996	65776	26.12
183	12	9.88	4.94	3.29	1397	349	155	23.34
184	8	11.27	5.64	3.76	724	181	80.48	17.53
186	10	55.77	27.88	18.59	32716	8179	3635	20.48
192	20	11.47	5.73	3.82	433	108	48.12	34.17
193	18	112	56.11	37.4	28410	7103	3157	31.53
194	6	191	95.63	63.75	159263	39816	17696	14.45
195	5	43.08	21.54	14.36	3292	823	366	12.83
198	14	-3.35	-1.68	-1.12	117	29.16	12.96	26.12
199	17	13.92	6.96	4.64	1245	311	138	30.19
203	11	28.65	14.32	9.55	3980	995	442	21.92
211	9	621	311	207	639091	159773	71010	19.02
213	7	178	89.21	59.48	99123	24781	11014	16.01
214	11	4.38	2.19	1.46	154	38.59	17.15	21.92
215	21	2.62	1.31	0.87	77.73	19.43	8.64	35.48
222	14	-0.35	-0.18	-0.12	92	23	10.22	26.12
224	15	0.41	0.2	0.14	220	54.96	24.43	27.49

TABLE 4b. THE COMBINED *z*-SCORES FOR THE PARTICIPATING LABORATORIES FOR THE SILICEOUS MATERIAL

Lab Code	Number of analytes	Rescaled sum of scores (RSZ)			Sum of squared scores (SSZ)			Critical value
		$k = 0.5$	$k = 1.0$	$k = 1.5$	$k = 0.5$	$k = 1.0$	$k = 1.5$	χ^2
40	27	17.57	8.78	5.86	2573	643	286	43.19
55	22	9.42	4.71	3.14	431	108	47.88	36.78
61	26	4.68	2.34	1.56	242	60.45	26.87	41.92
76	15	34.94	17.47	11.65	32033	8008	3559	27.49
84	3	57.23	28.61	19.08	3692	923	410	9.35
139	8	4.22	2.11	1.41	36.82	9.2	4.09	17.53
149	10	-2.45	-1.22	-0.82	816	204	90.68	20.48
152	33	35.37	17.69	11.79	15138	3785	1682	50.73
169	27	1.96	0.98	0.65	87.16	21.79	9.68	43.19
170	15	2.96	1.48	0.99	105	26.27	11.68	27.49
172	34	-2.52	-1.26	-0.84	104	25.88	11.5	51.97
175	31	11.97	5.99	3.99	263	65.63	29.17	48.23
176	34	1.42	0.71	0.47	146	36.45	16.2	51.97
178	33	13.12	6.56	4.37	892	223	99	50.73
182	7	2.74	1.37	0.91	39.93	9.98	4.44	16.01
183	30	15.66	7.83	5.22	648	162	72.05	46.98
184	24	2.17	1.09	0.72	199	49.79	22.13	39.36
186	22	-10.44	-5.22	-3.48	3411	853	379	36.78
192	28	-2.22	-1.11	-0.74	469	117	52.14	44.46
193	23	7.6	3.8	2.53	412	103	45.74	38.08
194	26	8.14	4.07	2.71	1038	260	115	41.92
195	15	67.69	33.85	22.56	50778	12695	5642	27.49
198	25	4.97	2.48	1.66	65.65	16.41	7.29	40.65
199	34	-2.32	-1.16	-0.77	1298	324	144	51.97
203	22	42.11	21.06	14.04	10680	2670	1187	36.78
211	17	-35.72	-17.86	-11.91	15353	3838	1706	30.19
213	13	-8.34	-4.17	-2.78	753	188	83.63	24.74
214	19	6.15	3.07	2.05	64.11	16.03	7.12	32.85
215	35	4.99	2.49	1.66	125	31.2	13.87	53.2
222	24	-3.24	-1.62	-1.08	80.63	20.16	8.96	39.36
223	11	16.05	8.02	5.35	546	137	60.71	21.92
224	34	3.74	1.87	1.25	182	45.57	20.25	51.97

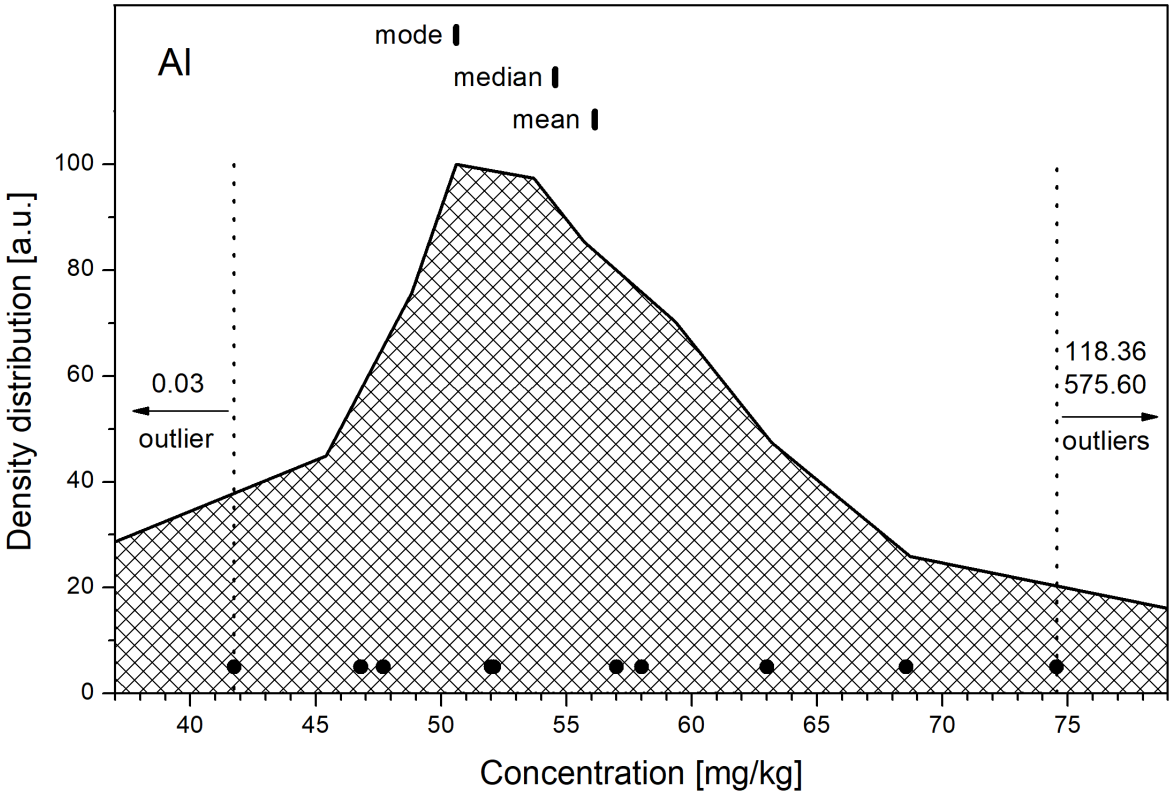

FIG. 4. The density distribution function for the analyte Al (Land-Plant material).

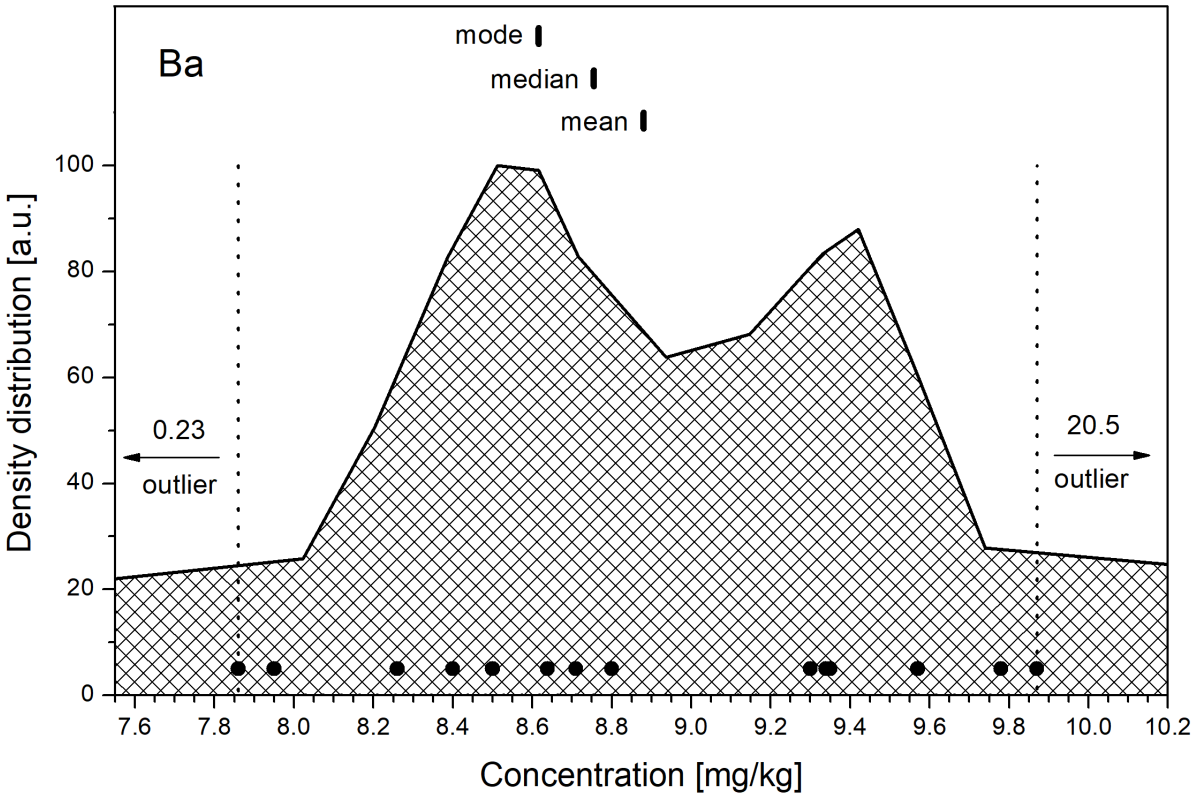

FIG. 5. The density distribution function for the analyte Ba (Land-Plant material).

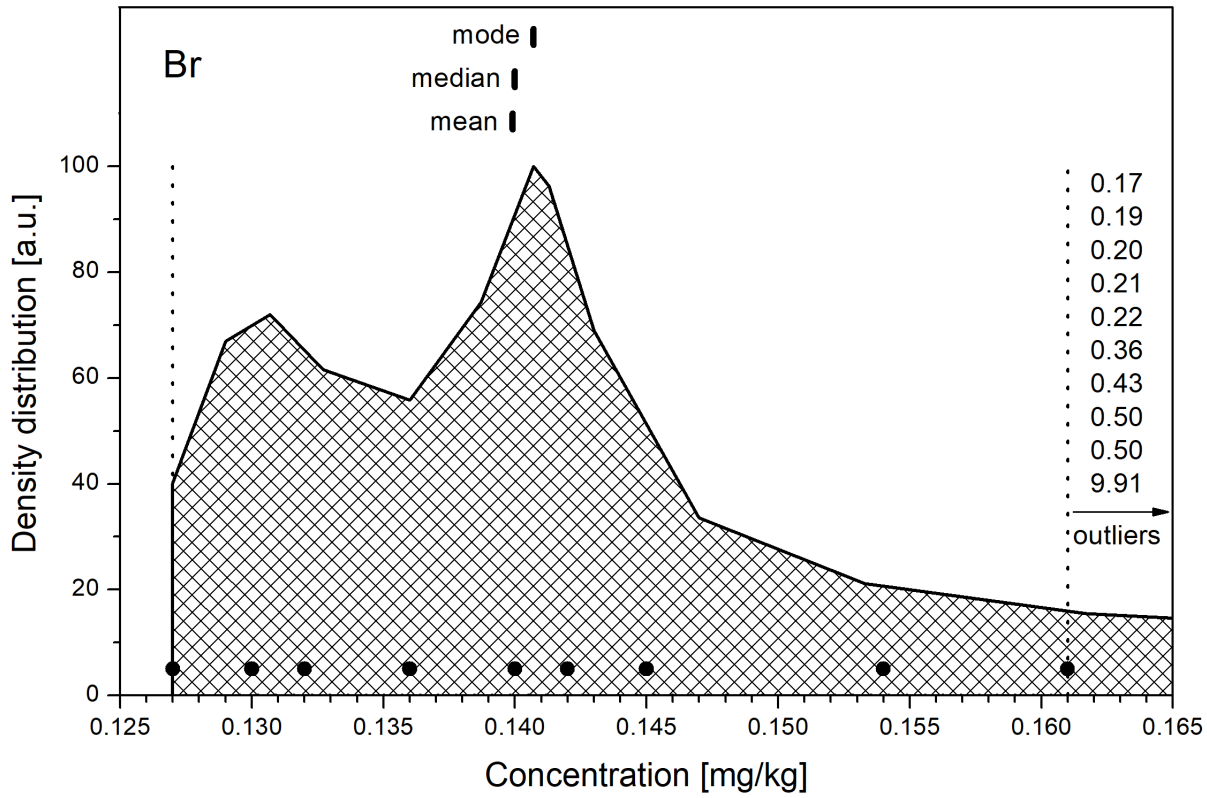

FIG. 6. The density distribution function for the analyte Br (Land-Plant material).

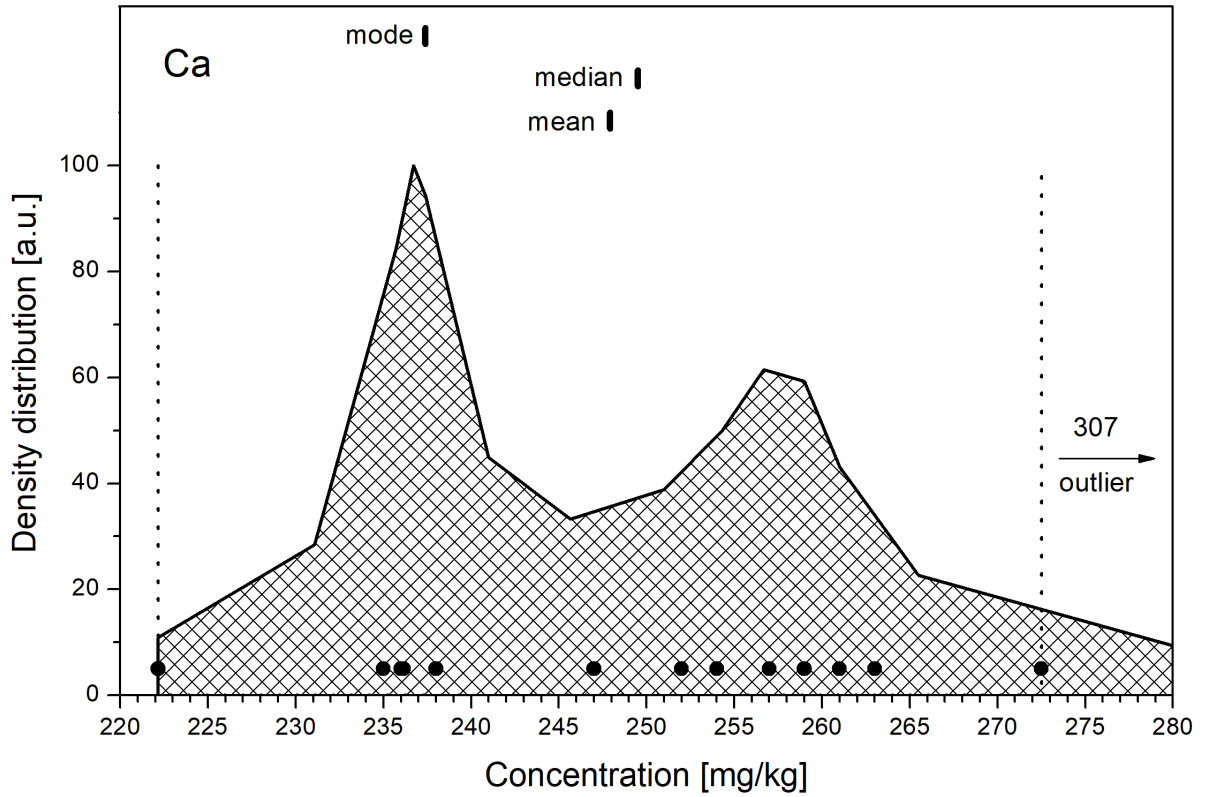

FIG. 7. The density distribution function for the analyte Ca (Land-Plant material).

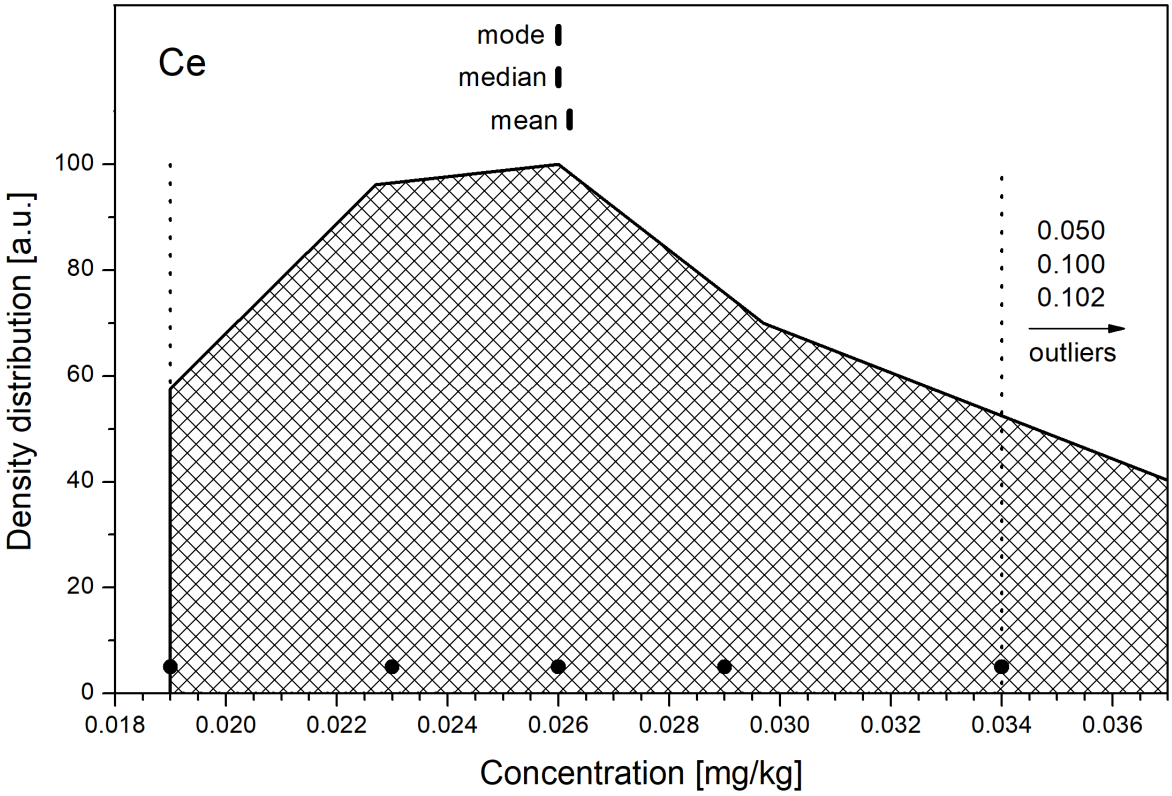

FIG. 8. The density distribution function for the analyte Ce (Land-Plant material).

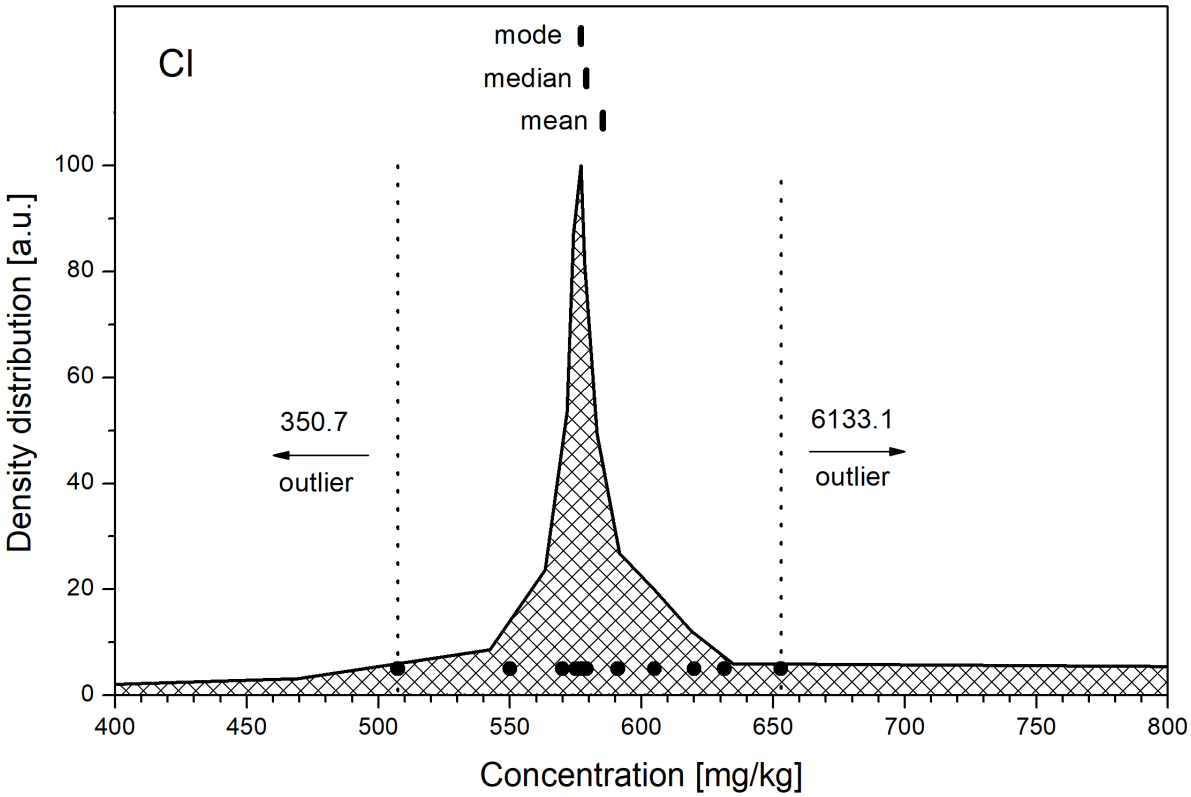

FIG. 9. The density distribution function for the analyte Cl (Land-Plant material).

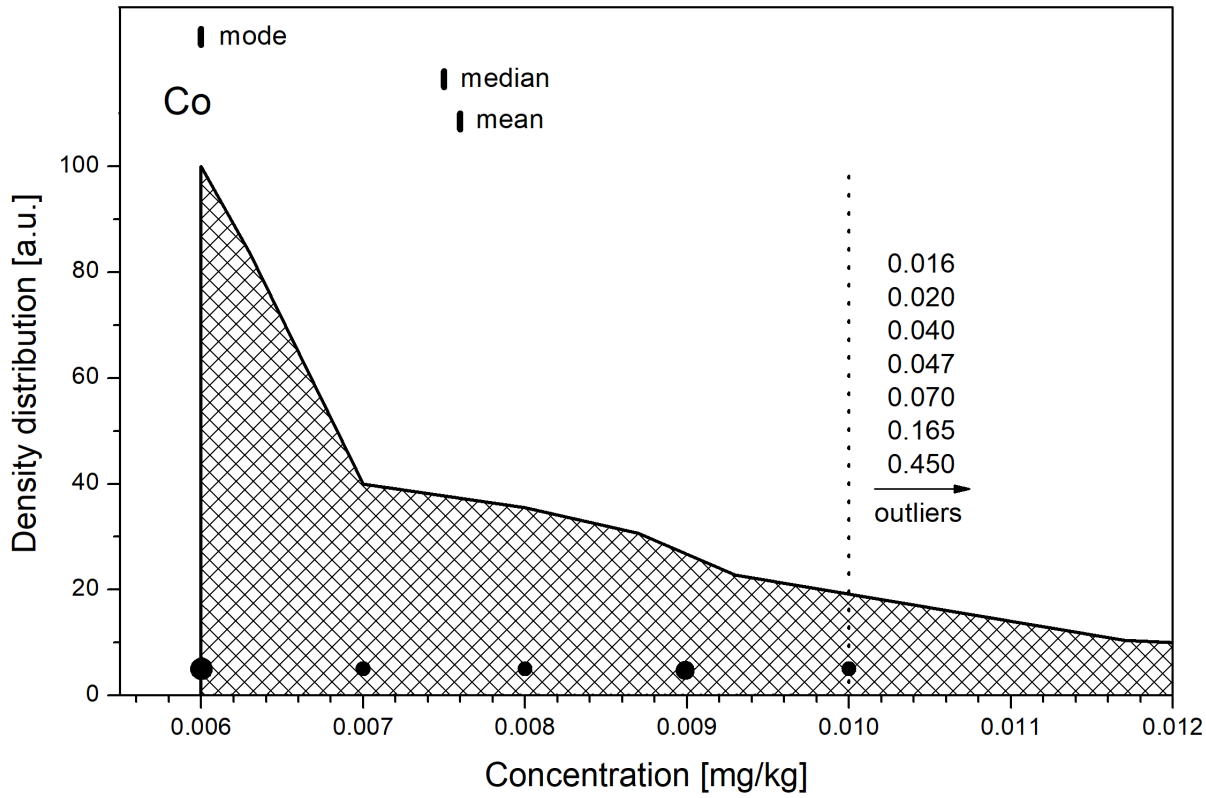

FIG. 10. The density distribution function for the analyte Co (Land-Plant material).

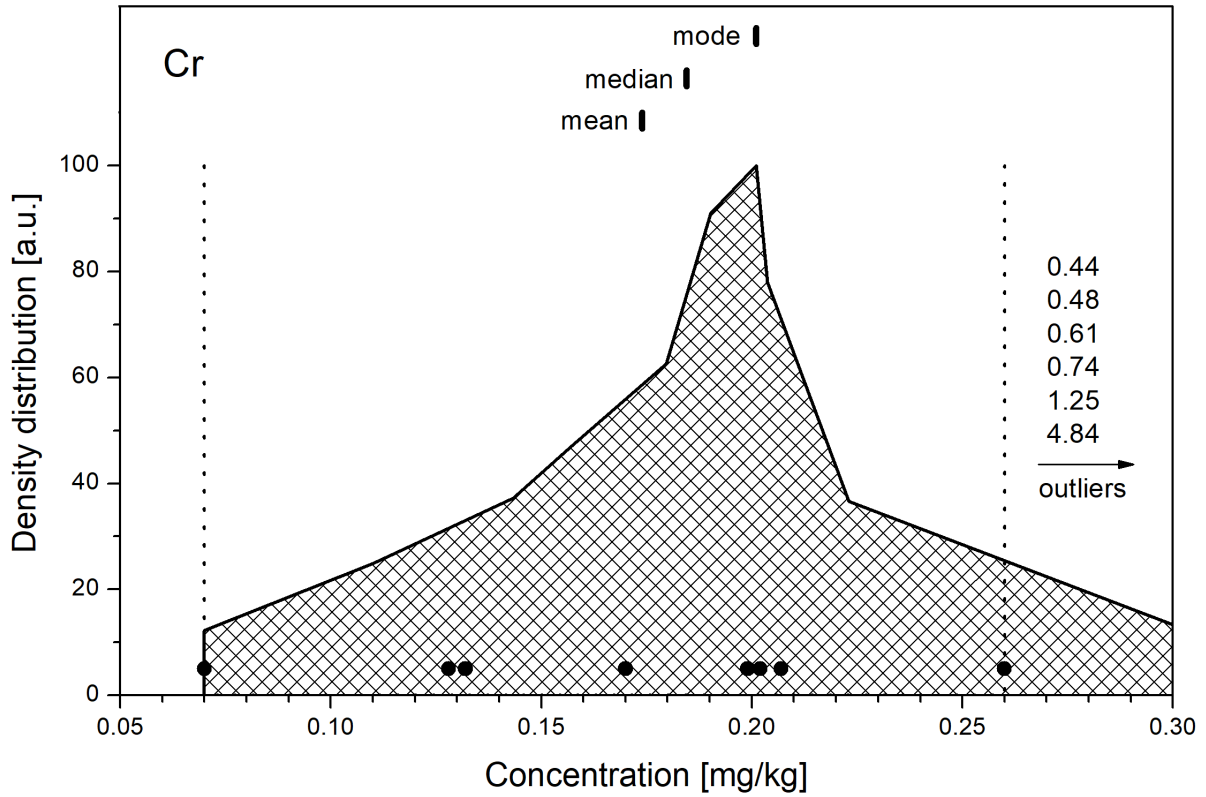

FIG. 11. The density distribution function for the analyte Cr (Land-Plant material).

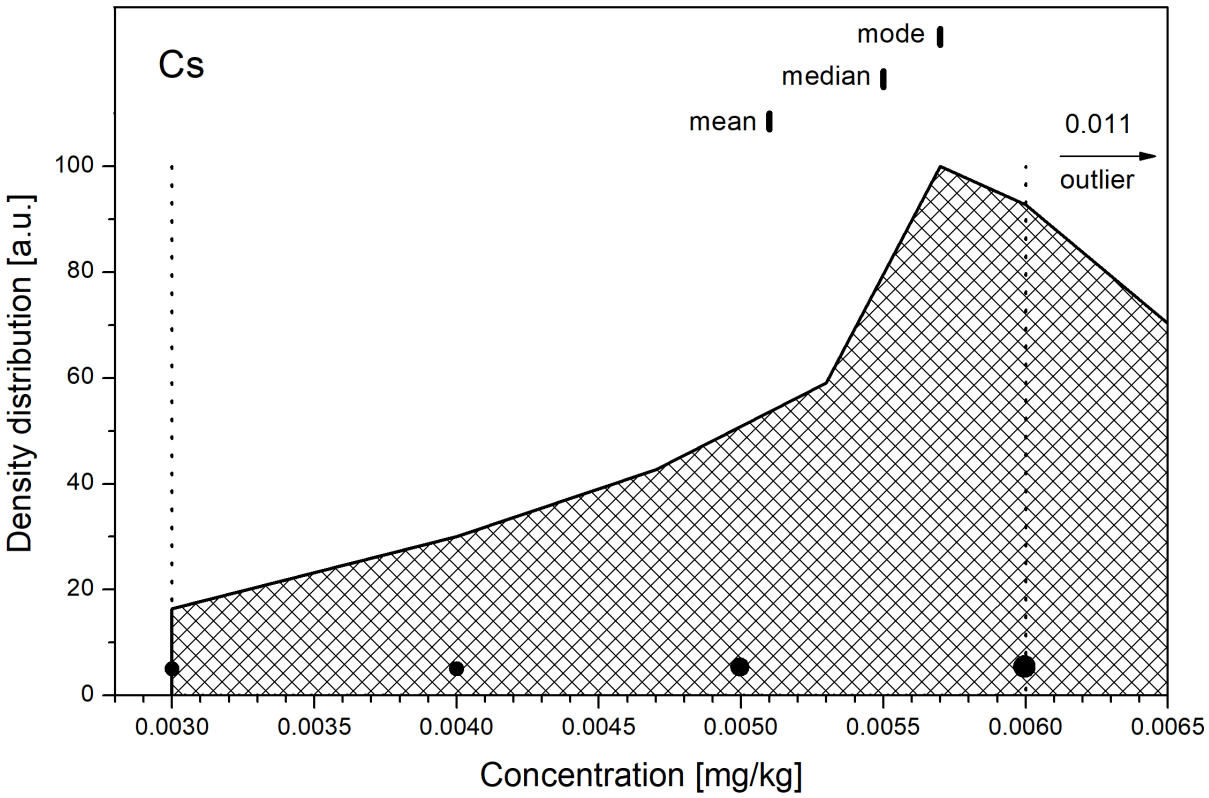

FIG. 12. The density distribution function for the analyte Cs (Land-Plant material).

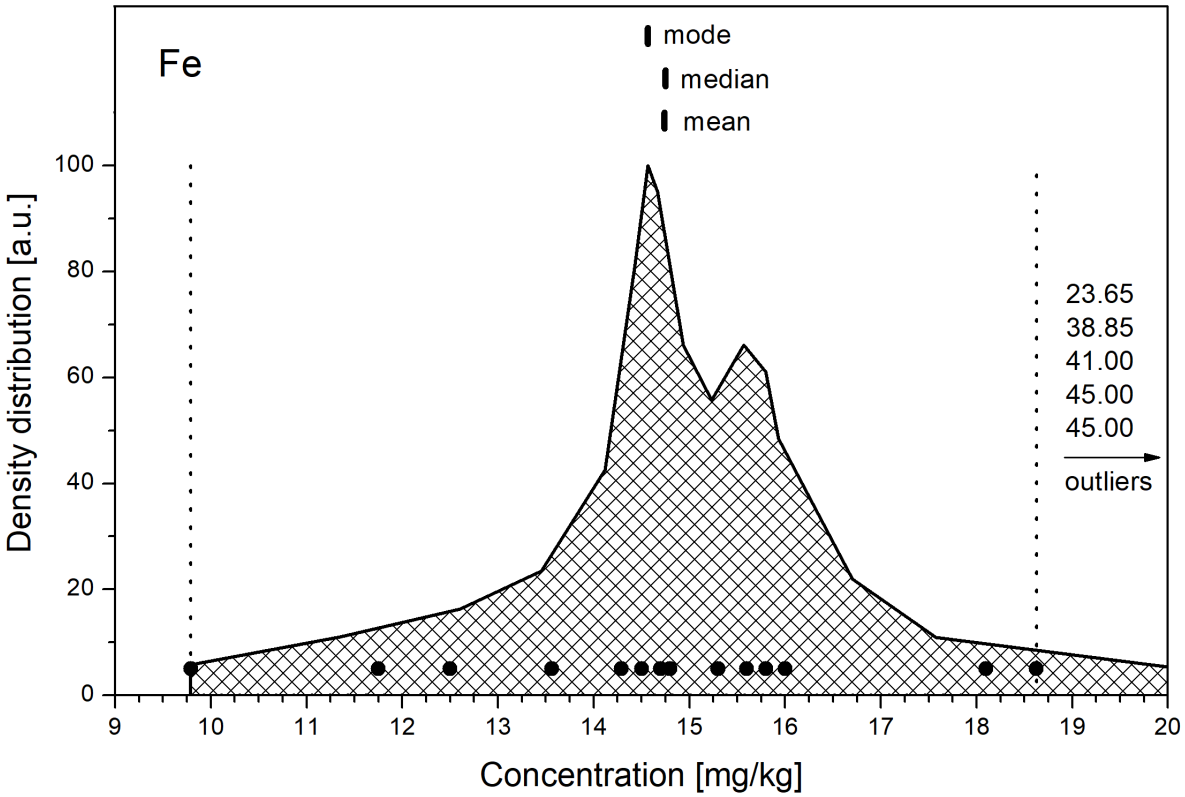

FIG. 13. The density distribution function for the analyte Fe (Land-Plant material).

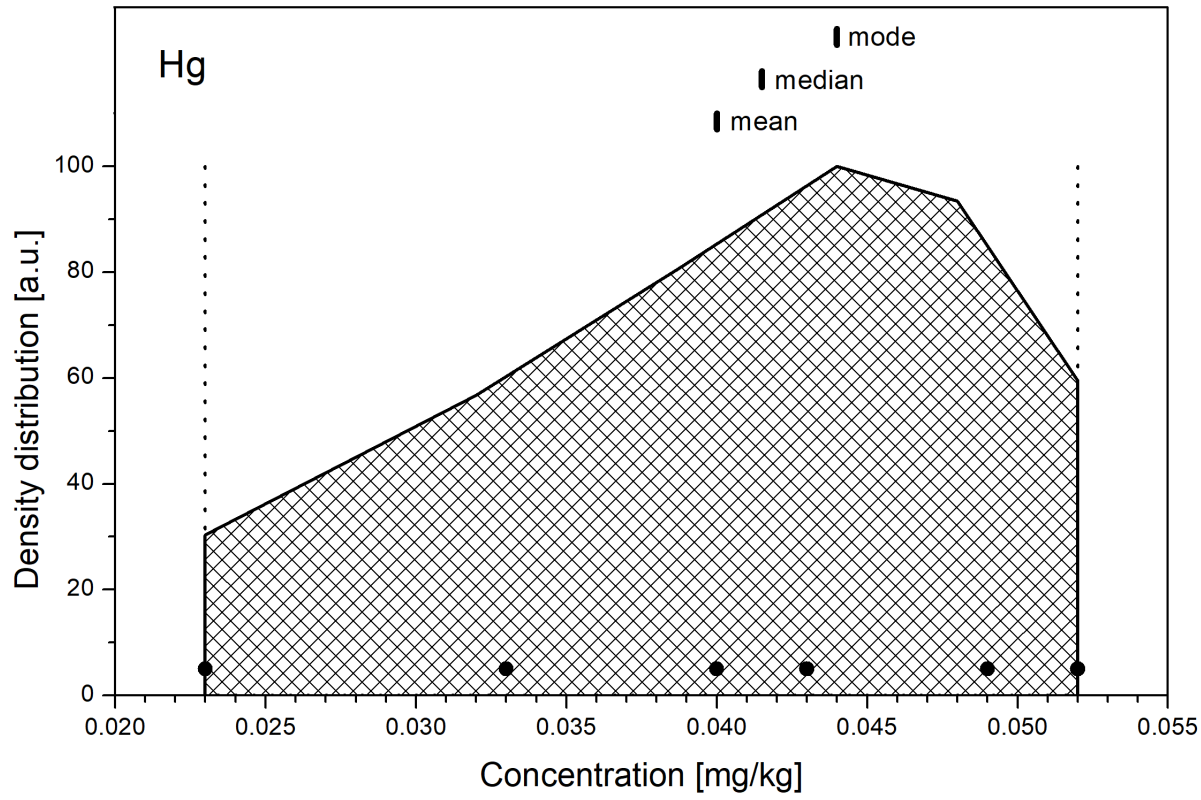

FIG. 14. The density distribution function for the analyte Hg (Land-Plant material).

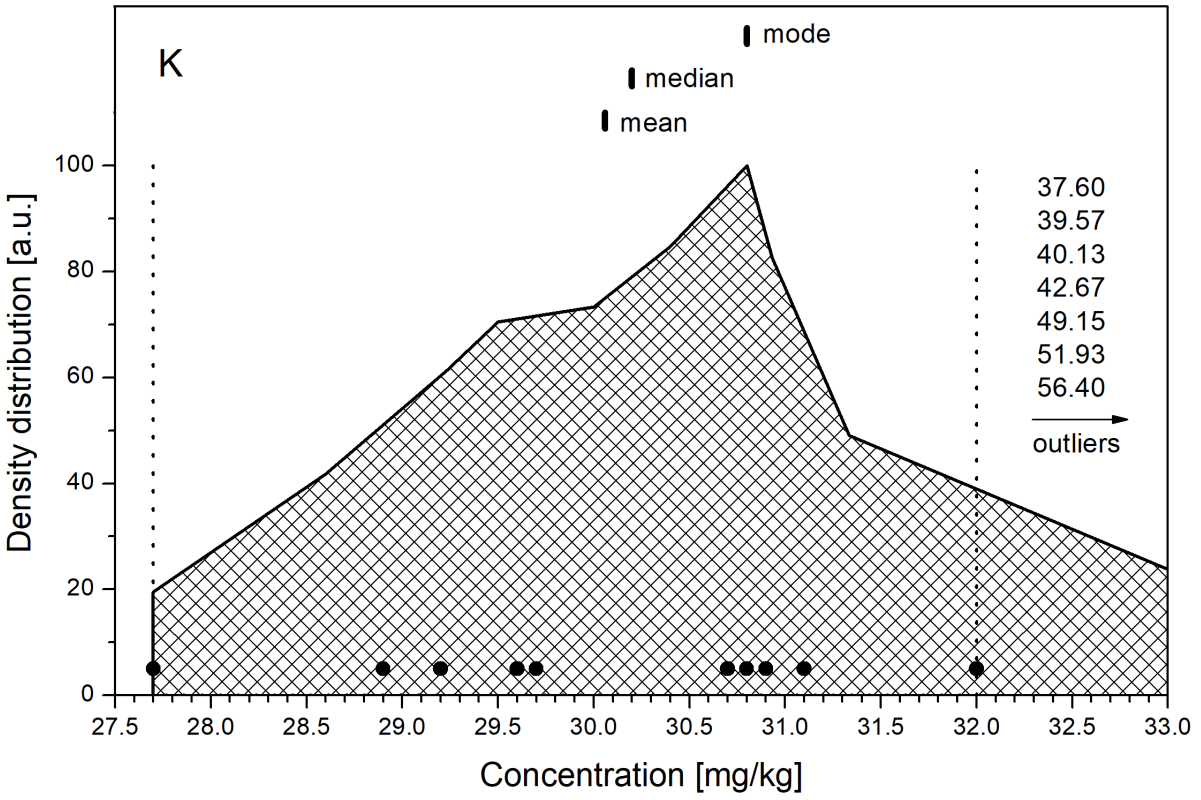

FIG. 15. The density distribution function for the analyte K (Land-Plant material).

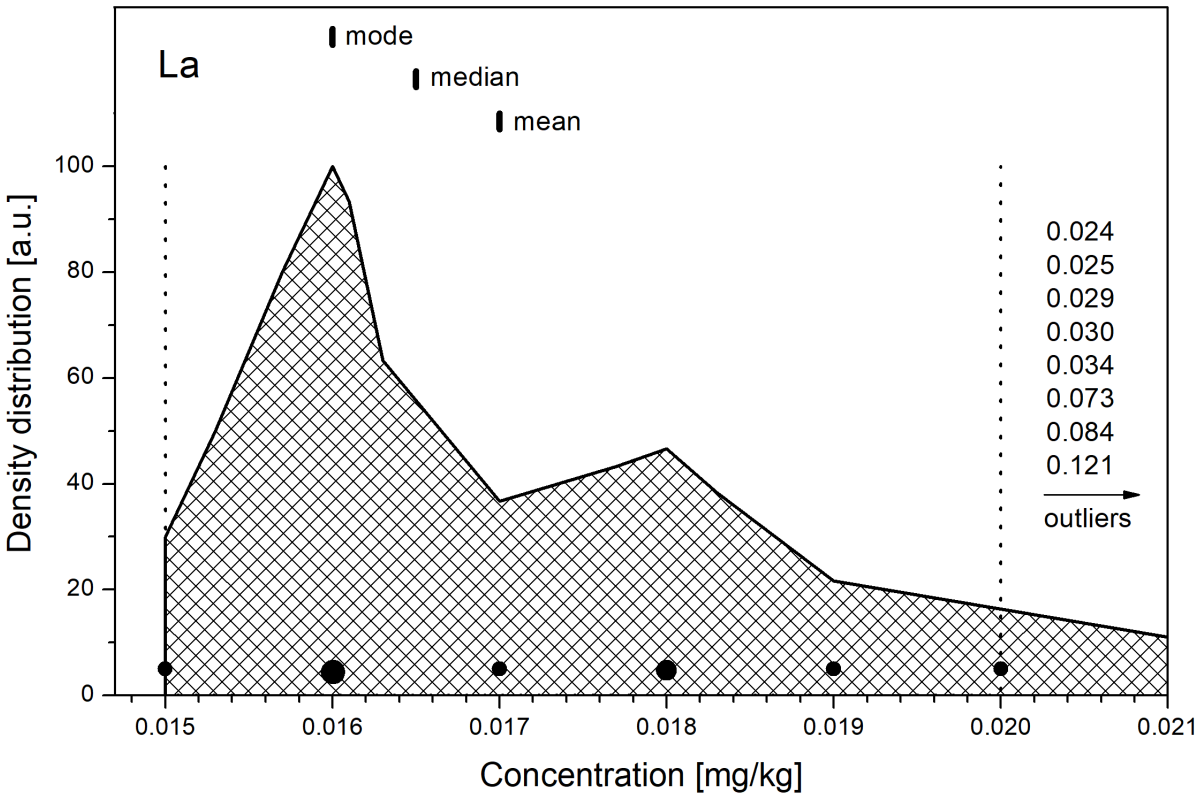

FIG. 16. The density distribution function for the analyte La (Land-Plant material).

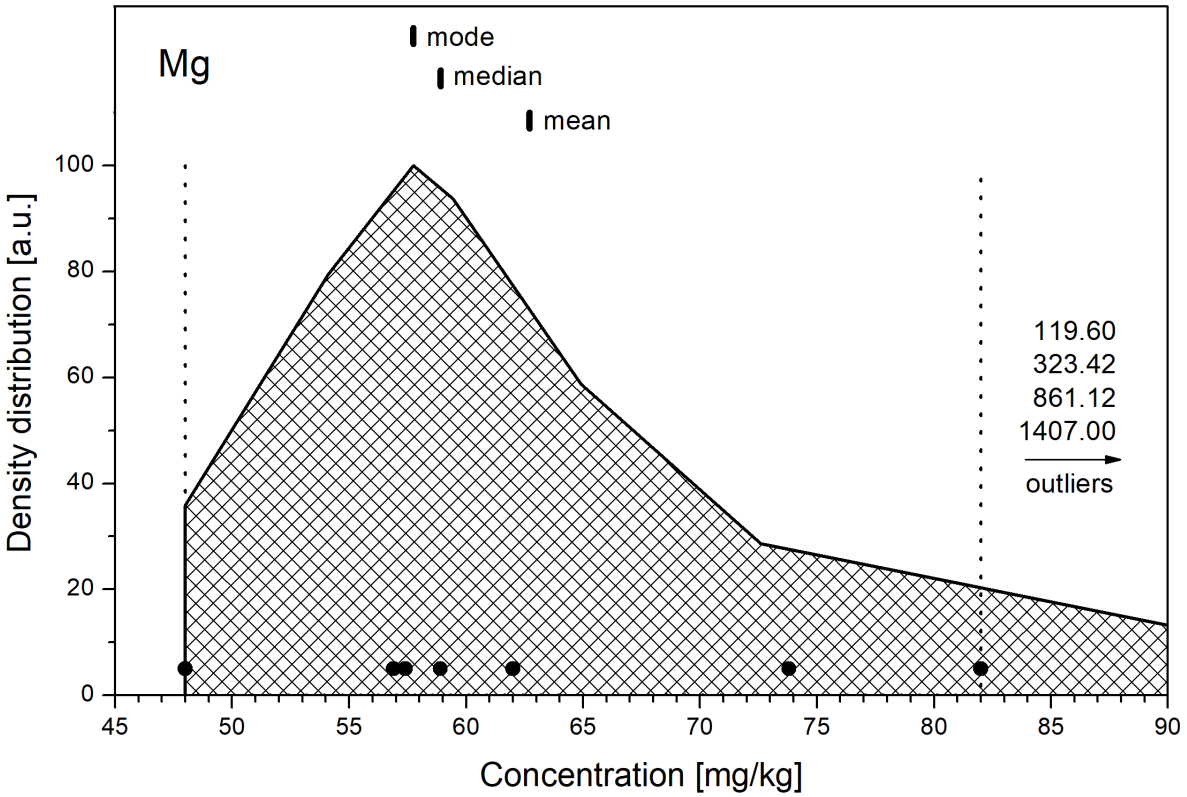

FIG. 17. The density distribution function for the analyte Mg (Land-Plant material).

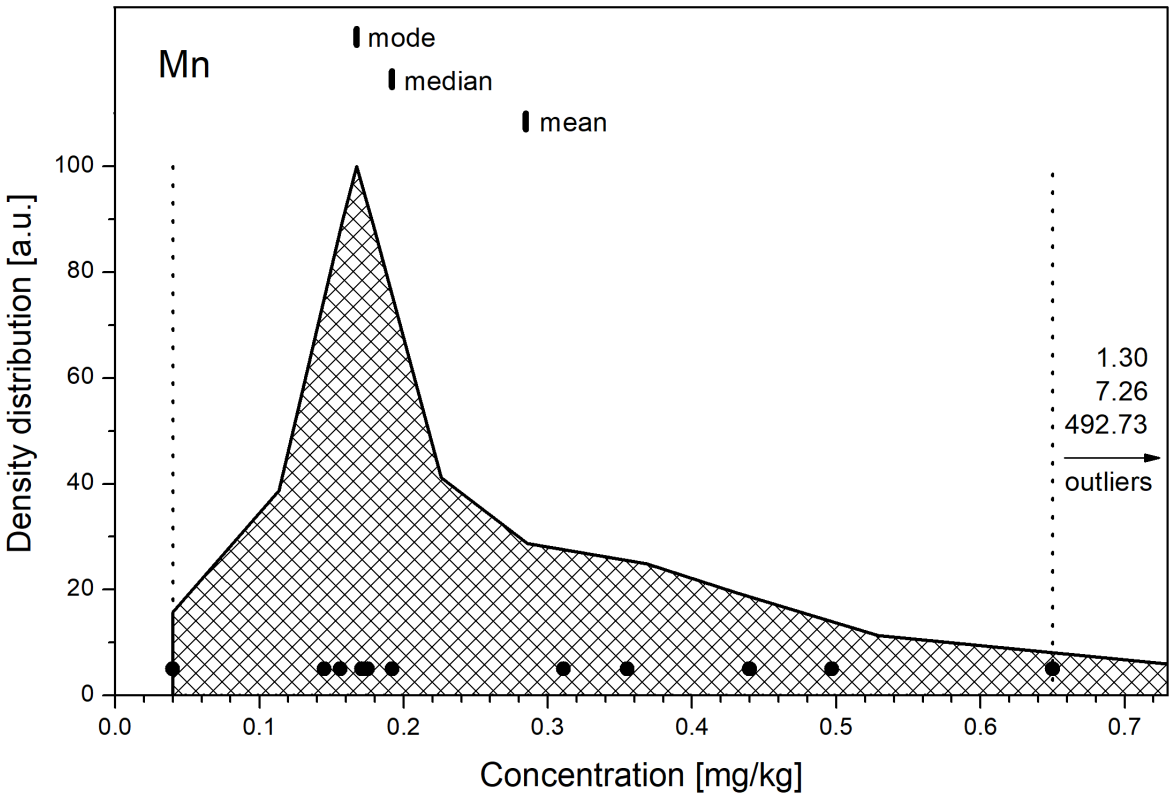

FIG. 18. The density distribution function for the analyte Mn (Land-Plant material).

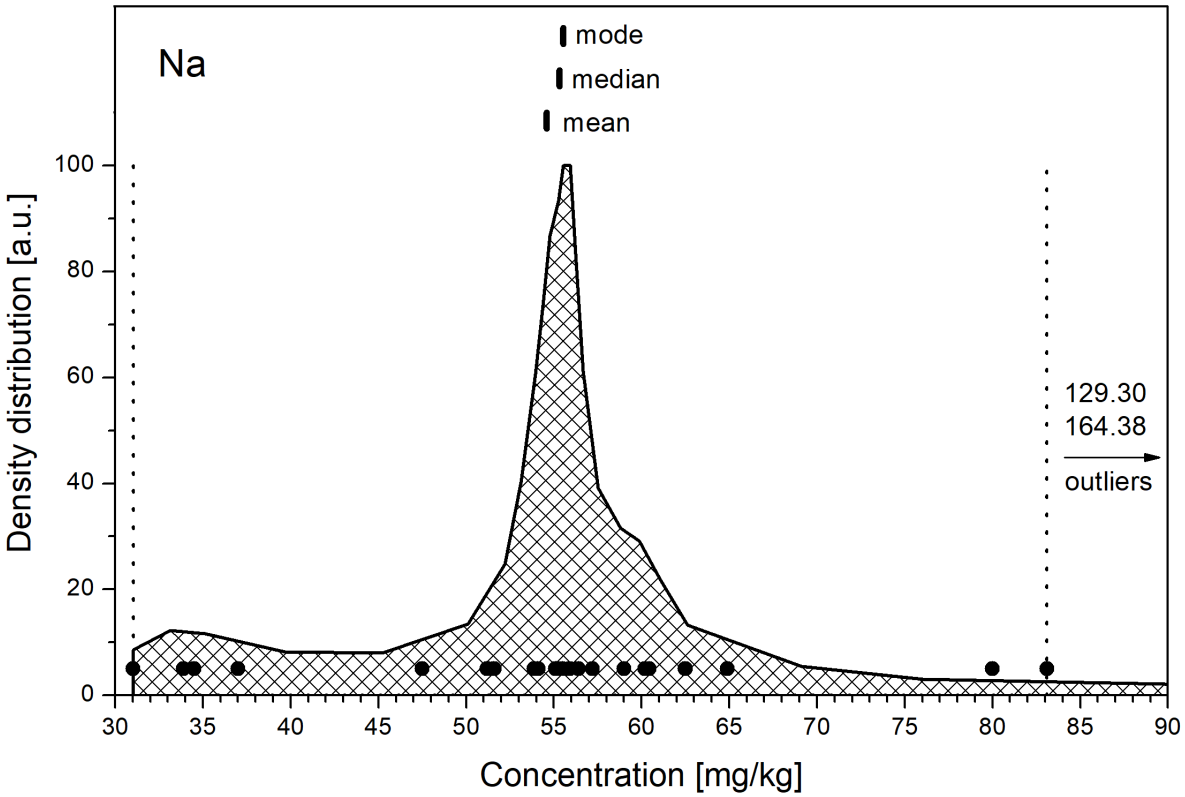

FIG. 19. The density distribution function for the analyte Na (Land-Plant material).

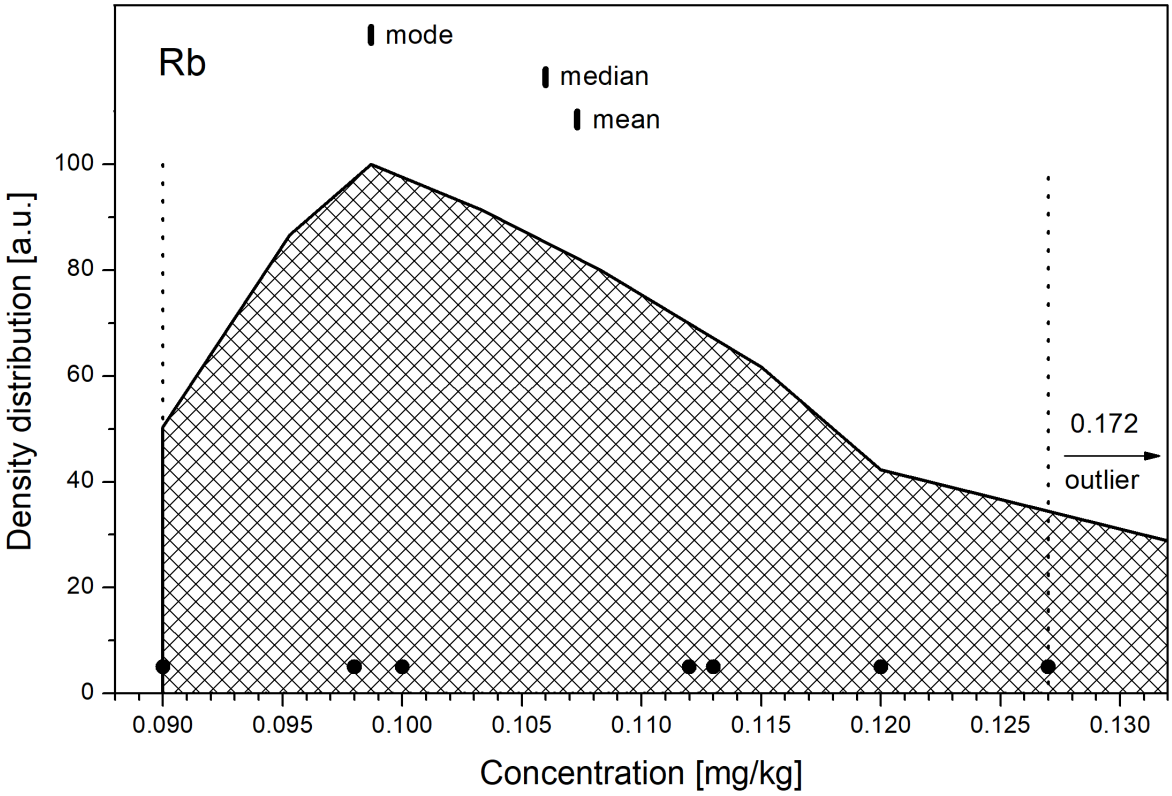

FIG. 20. The density distribution function for the analyte Rb (Land-Plant material).

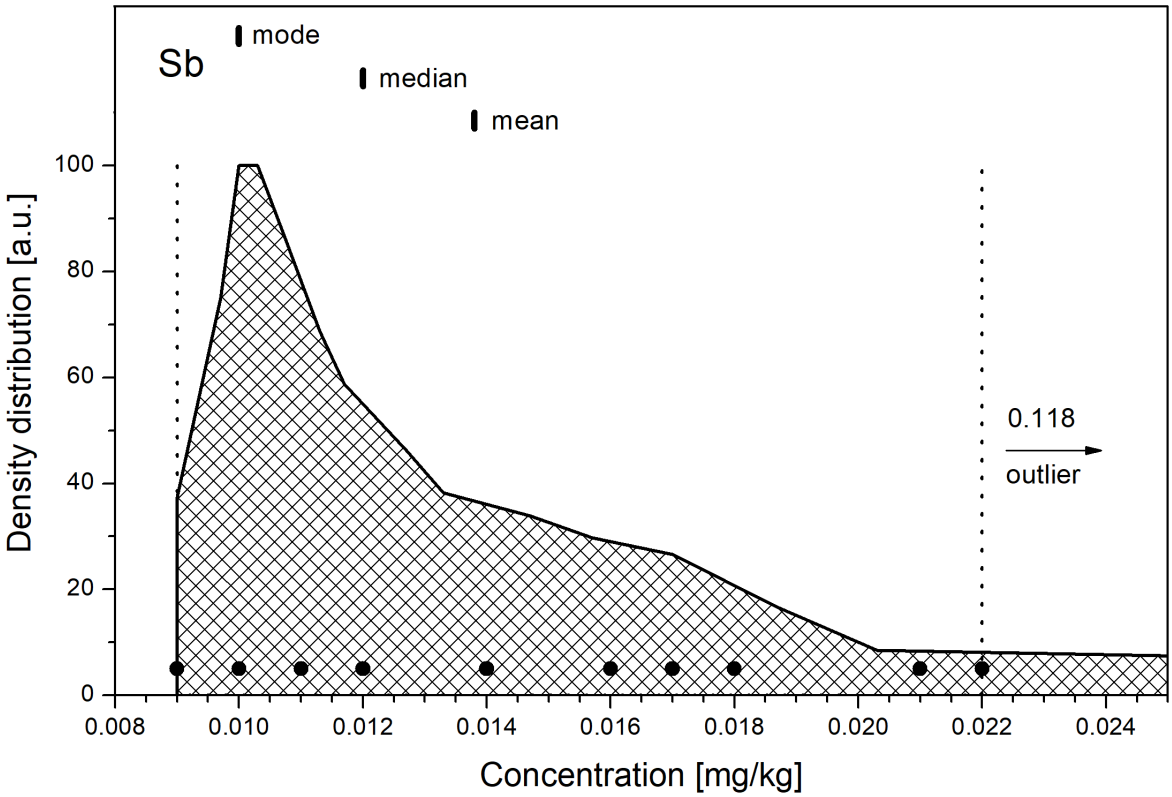

FIG. 21. The density distribution function for the analyte Sb (Land-Plant material).

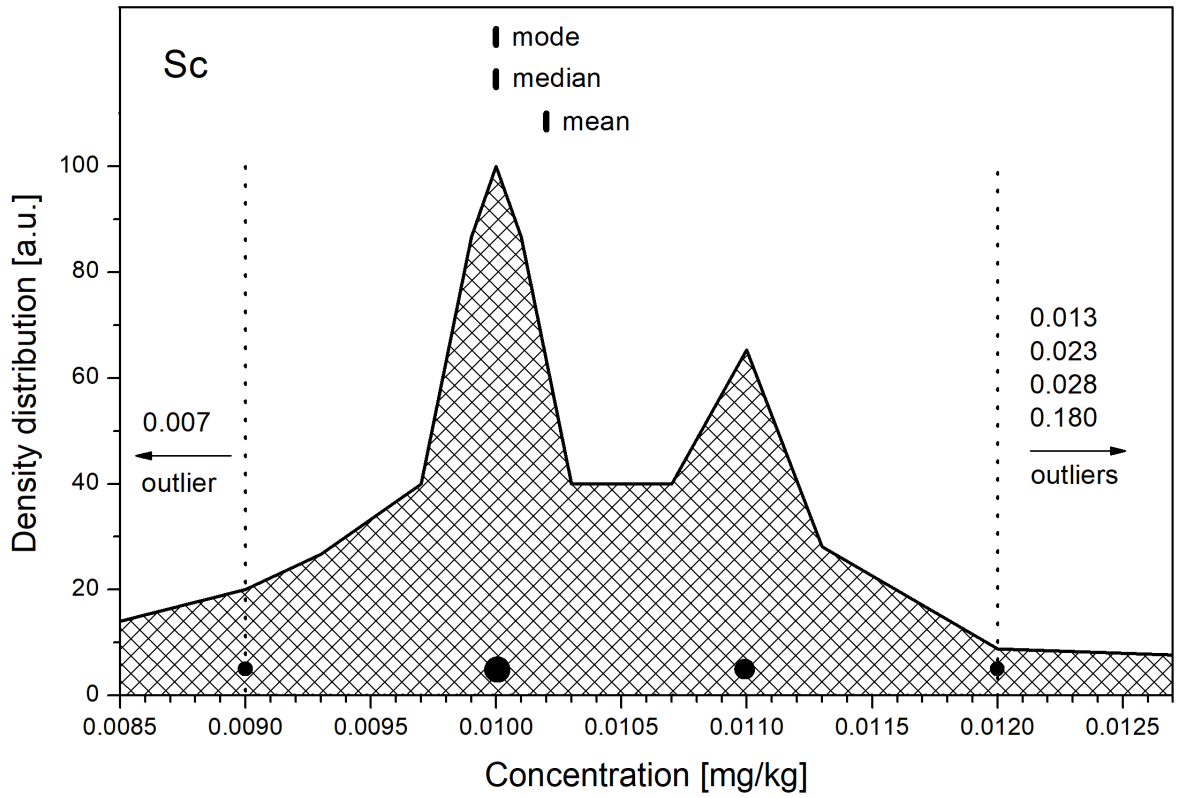

FIG. 22. The density distribution function for the analyte Sc (Land-Plant material).

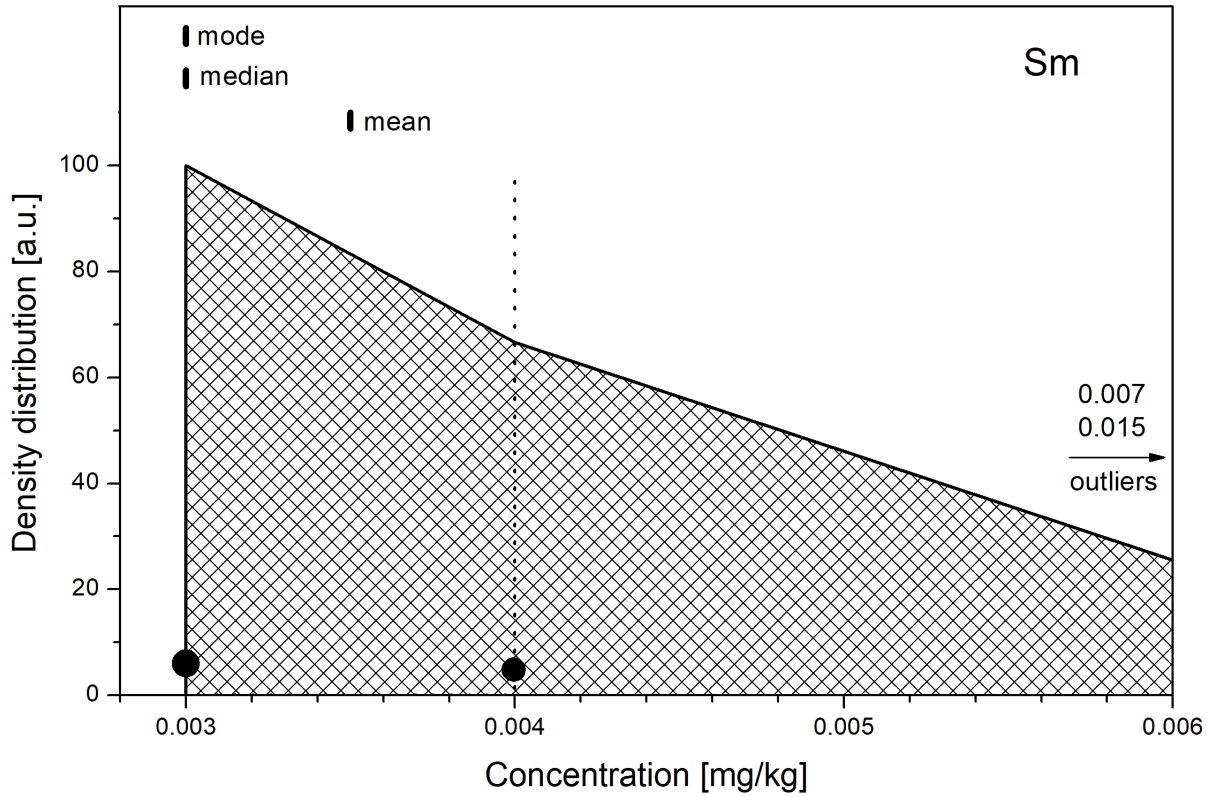

FIG. 23. The density distribution function for the analyte Sm (Land-Plant material).

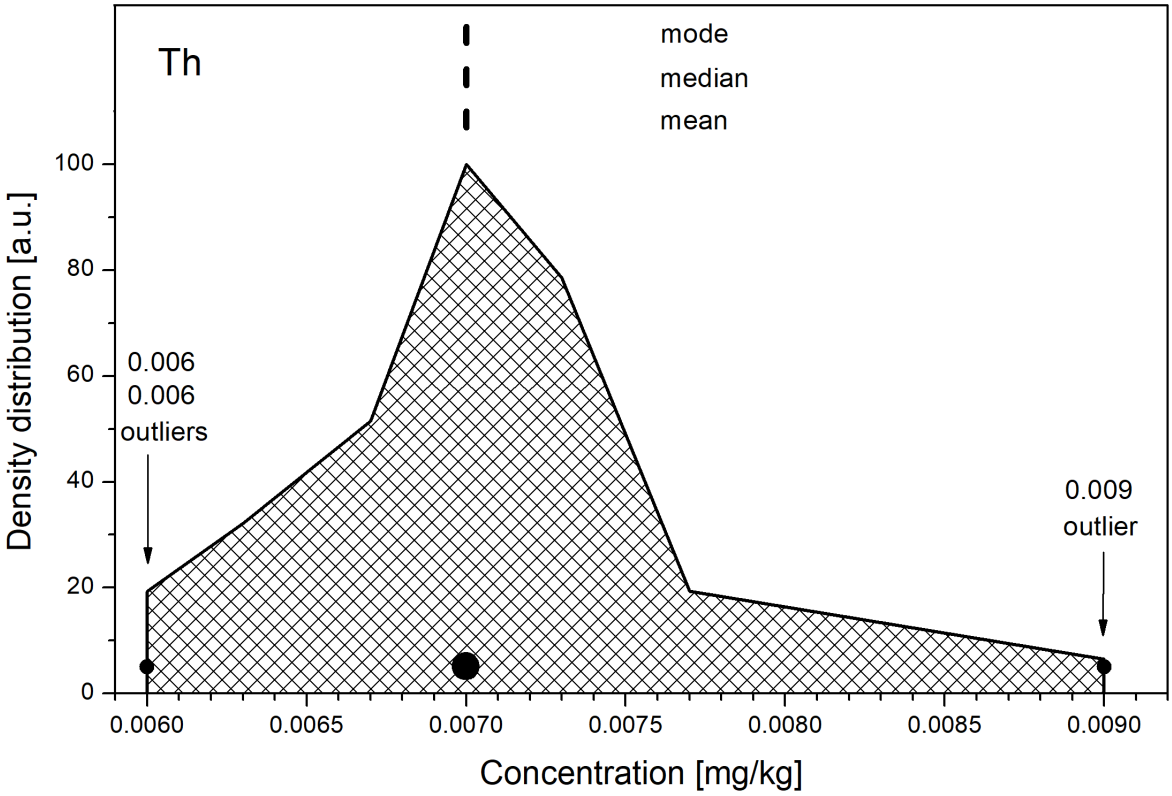

FIG. 24. The density distribution function for the analyte Th (Land-Plant material).

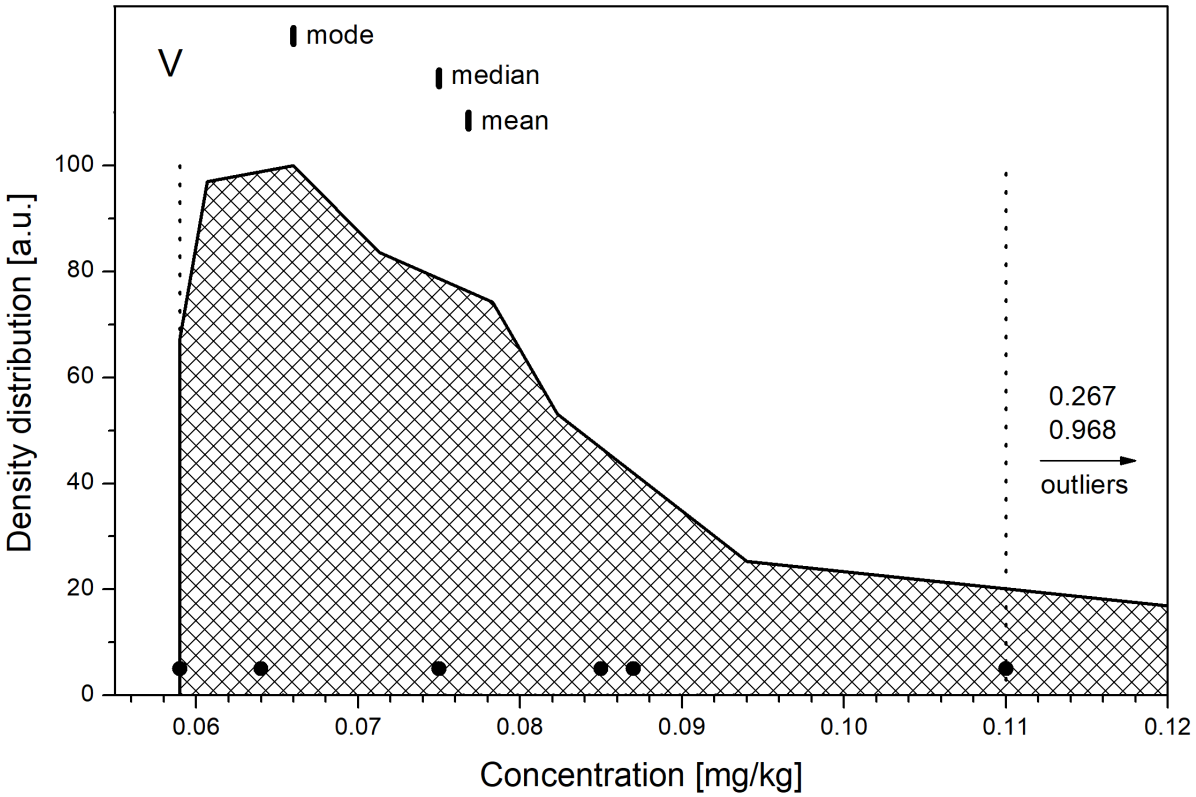

FIG. 25. The density distribution function for the analyte V (Land-Plant material).

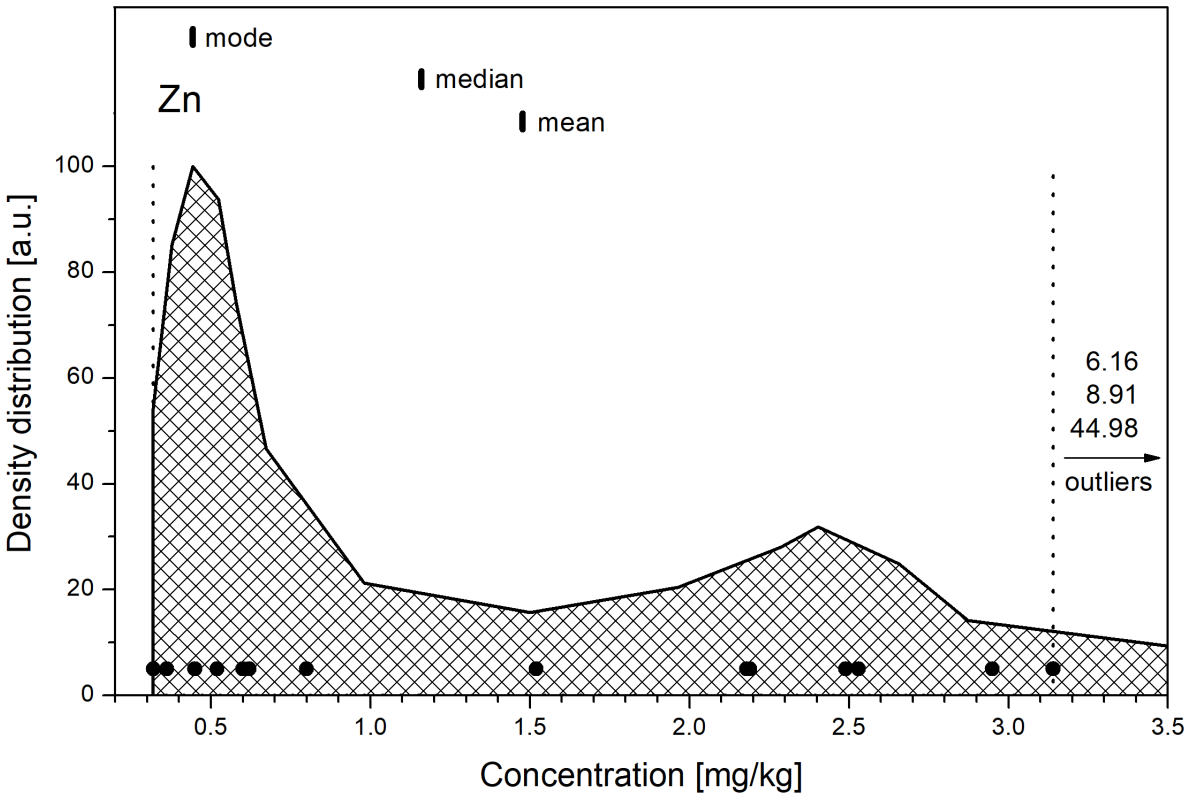

FIG. 26. The density distribution function for the analyte Zn (Land-Plant material).

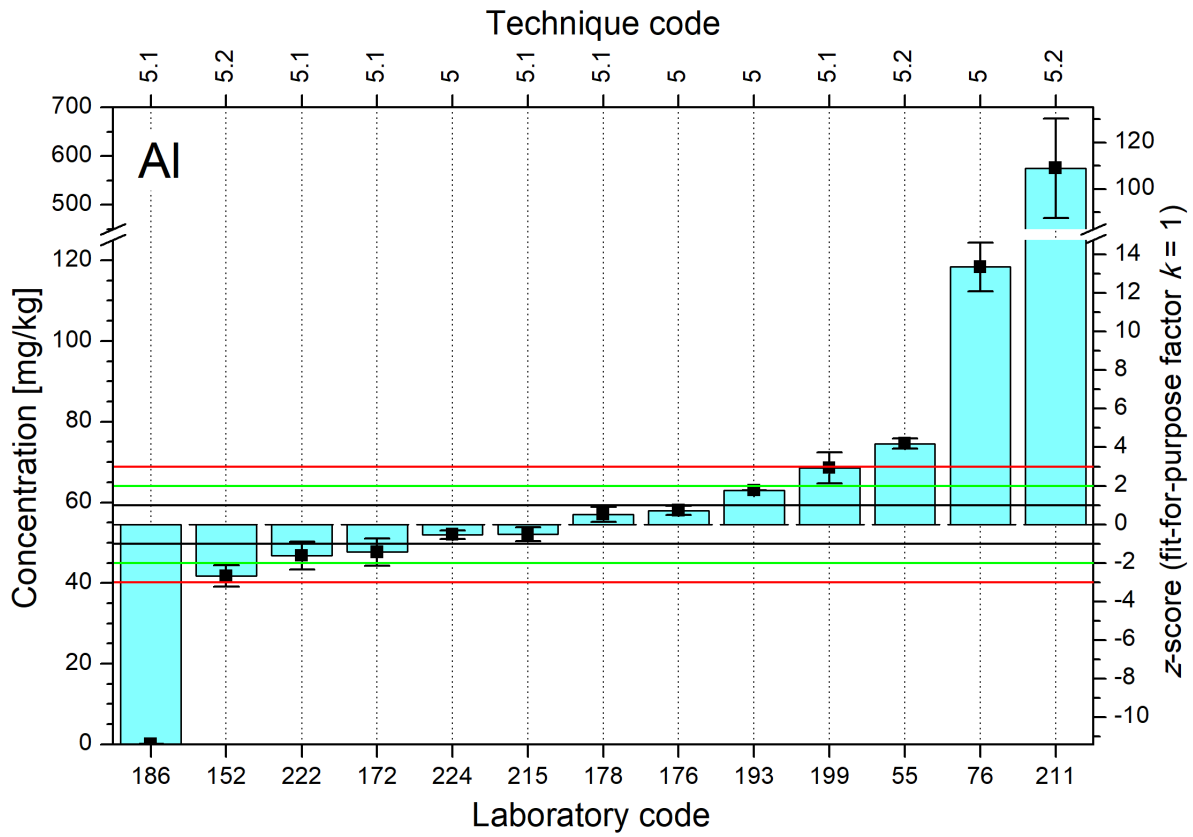

FIG. 27. Distributions of z-scores for analyte Al (Land-Plant material).

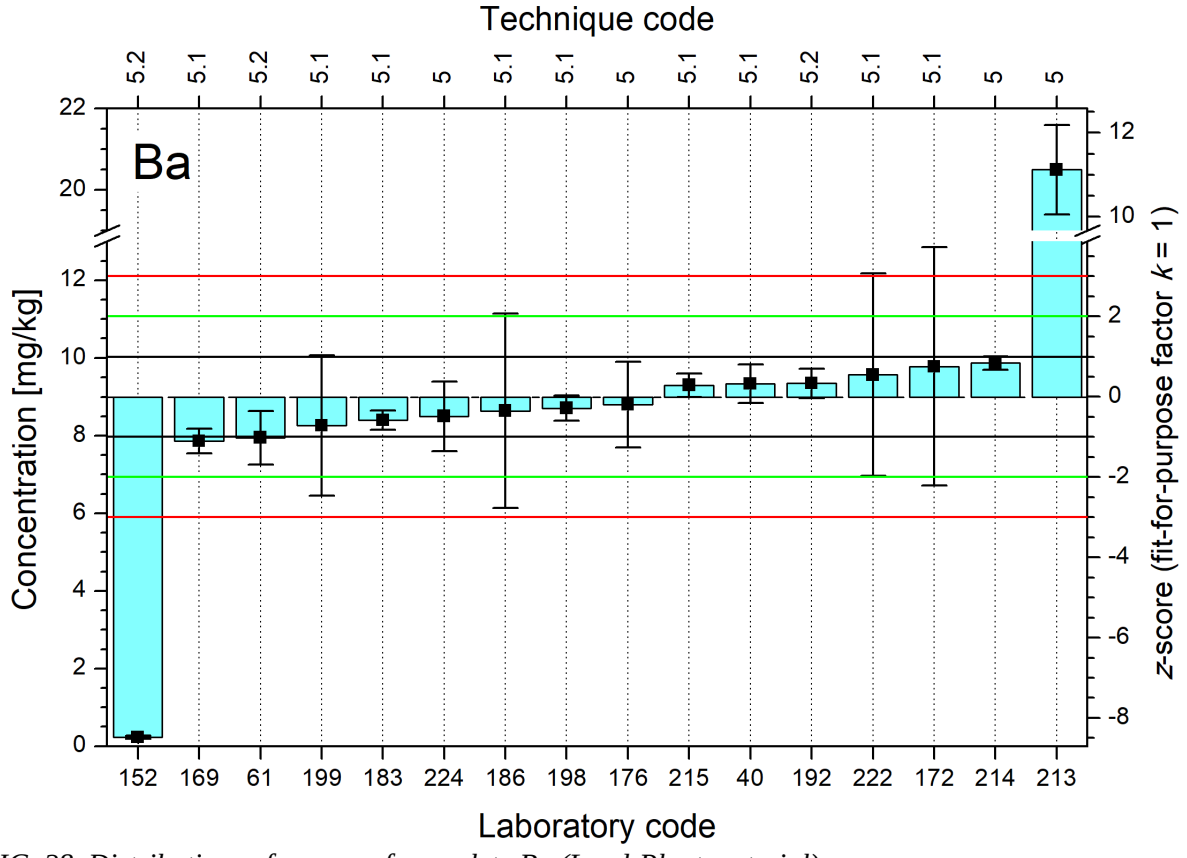

FIG. 28. Distributions of z-scores for analyte Ba (Land-Plant material).

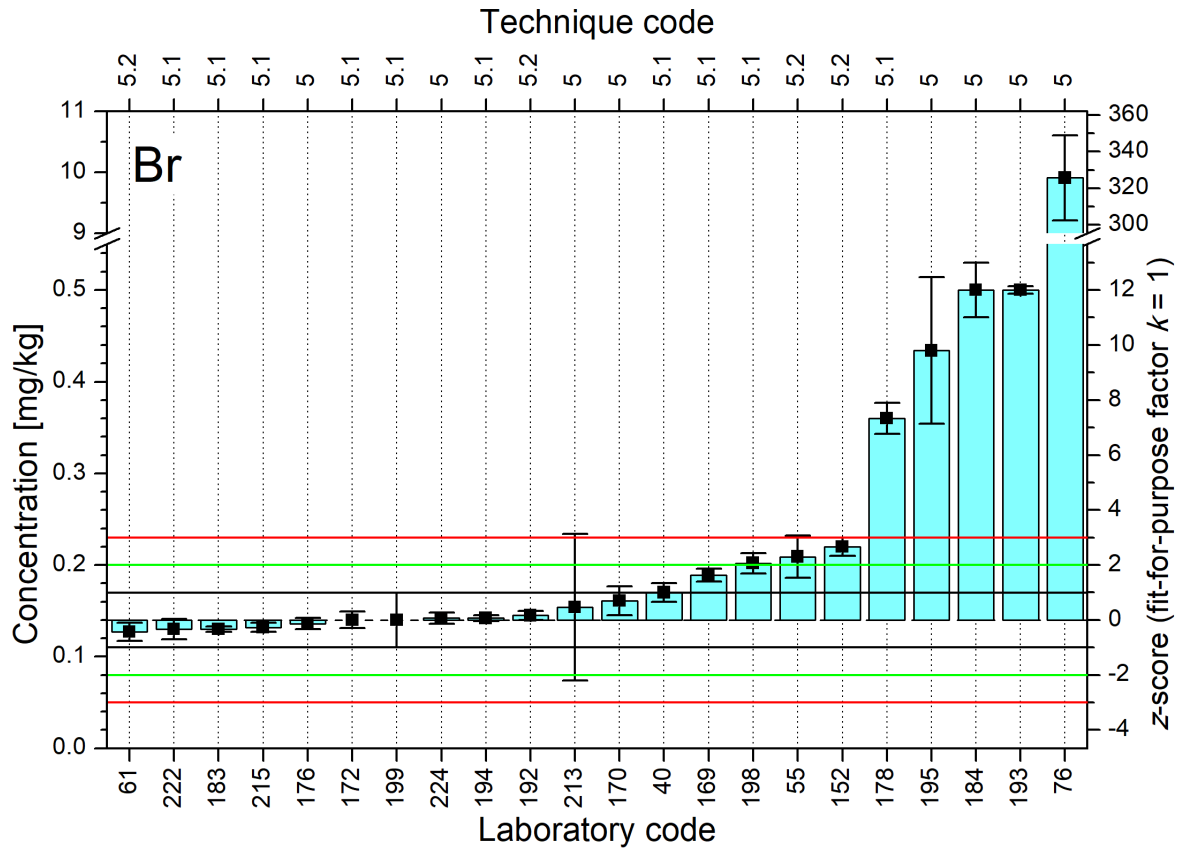

FIG. 29. Distributions of z-scores for analyte Br (Land-Plant material).

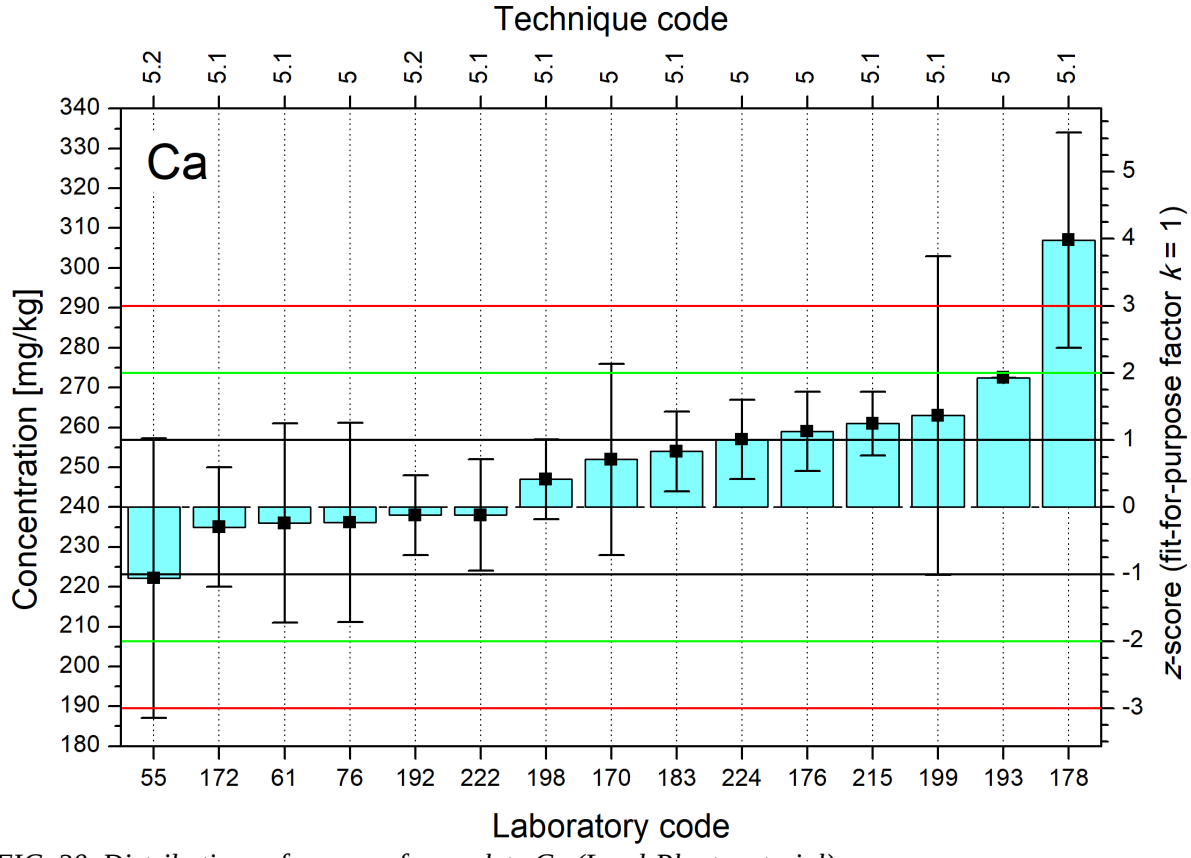

FIG. 30. Distributions of z-scores for analyte Ca (Land-Plant material).

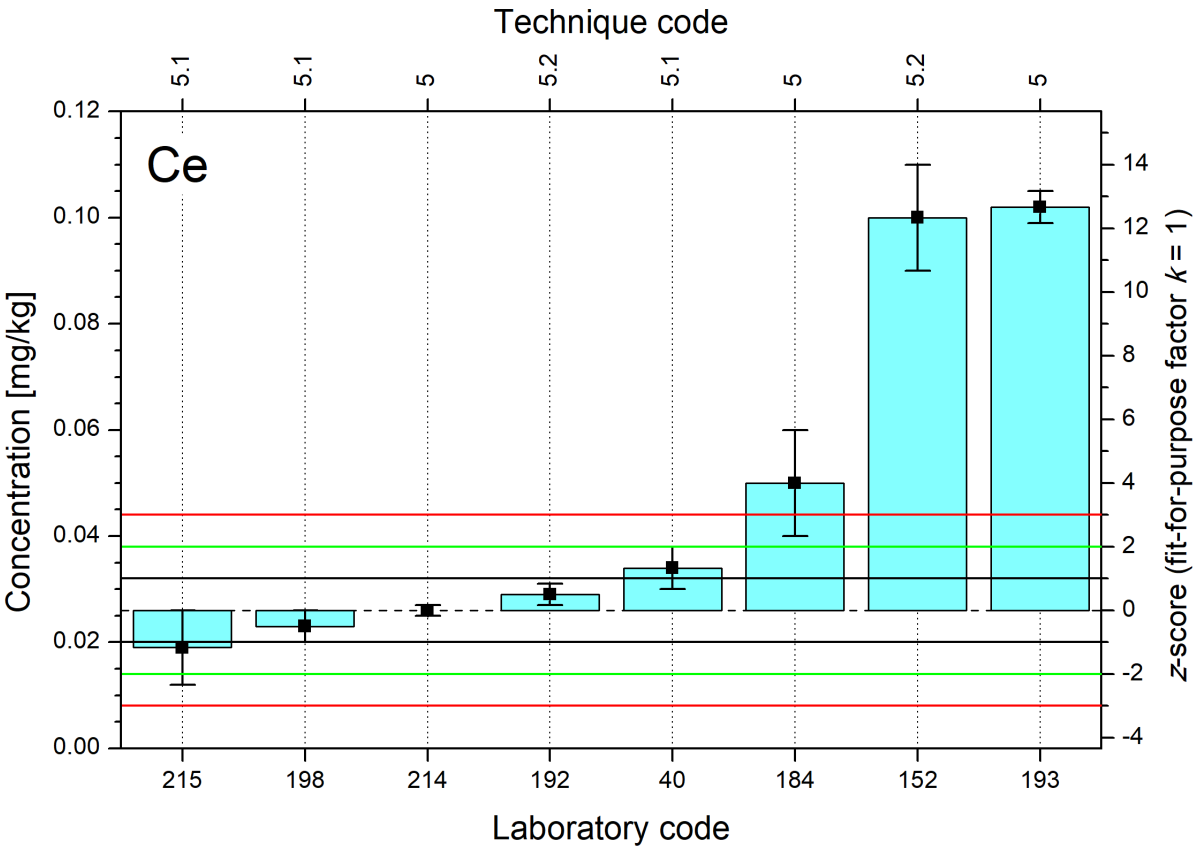

FIG. 31. Distributions of z-scores for analyte Ce (Land-Plant material).

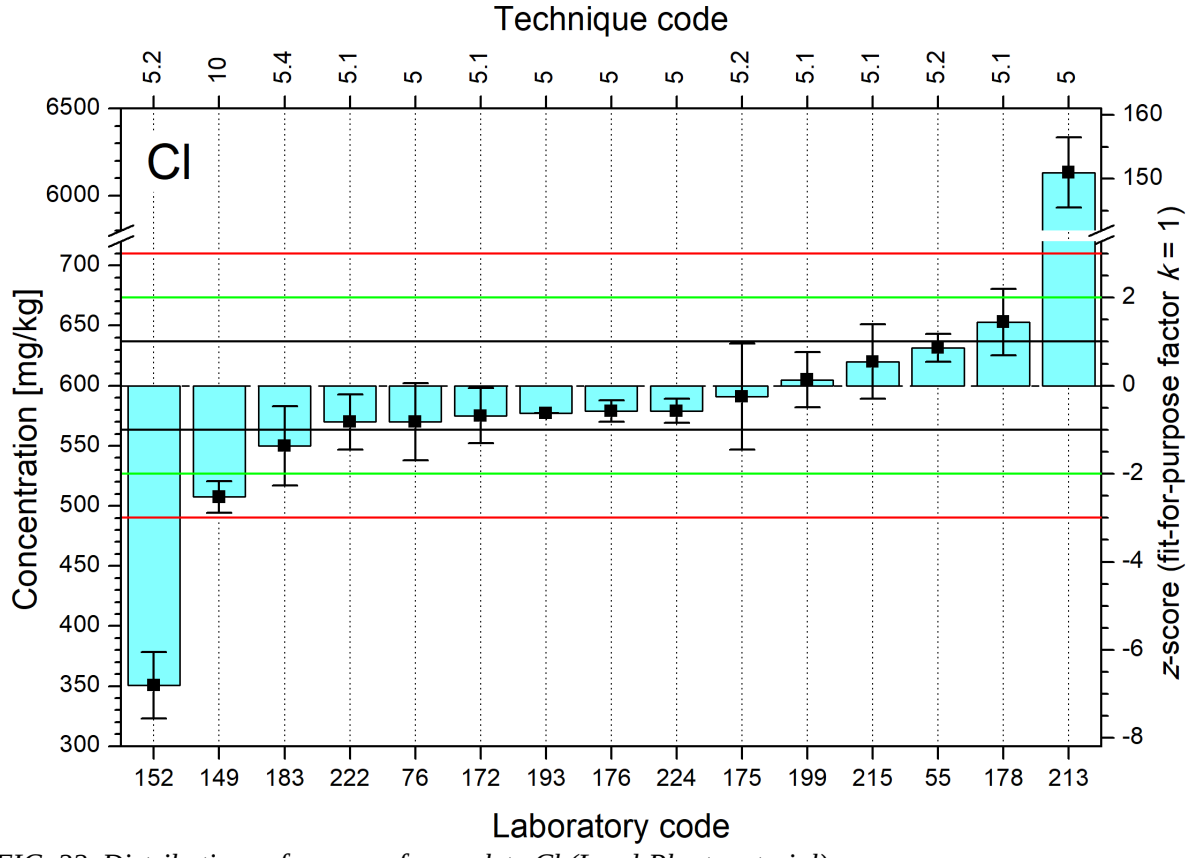

FIG. 32. Distributions of z-scores for analyte Cl (Land-Plant material).

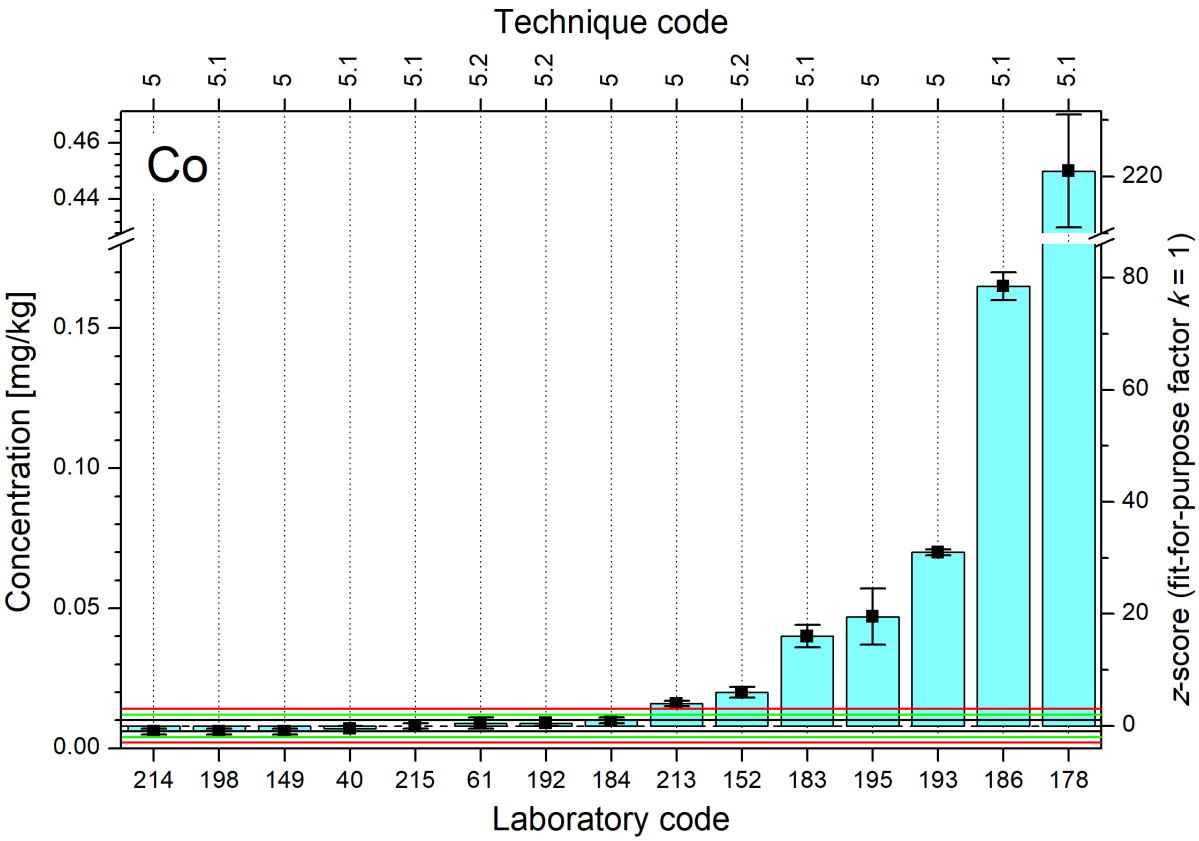

FIG. 33. Distributions of z-scores for analyte Co (Land-Plant material).

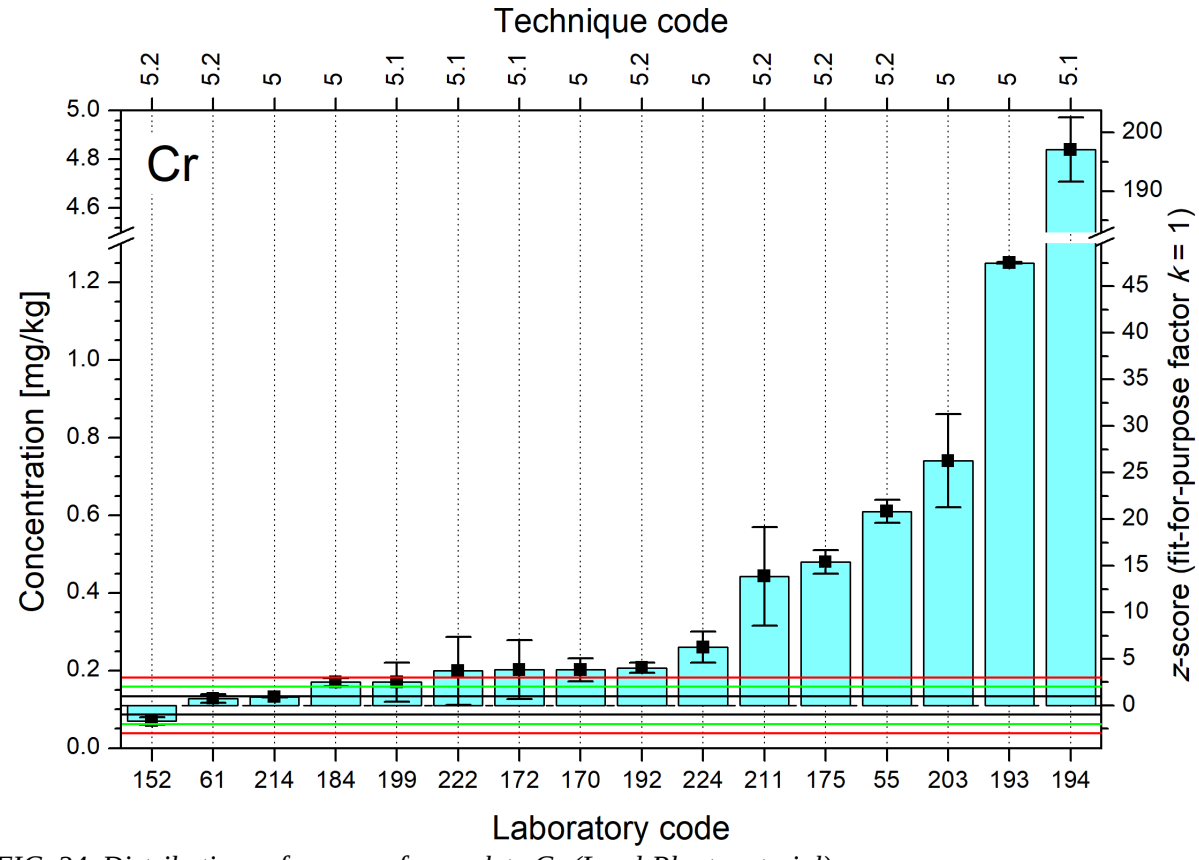

FIG. 34. Distributions of z-scores for analyte Cr (Land-Plant material).

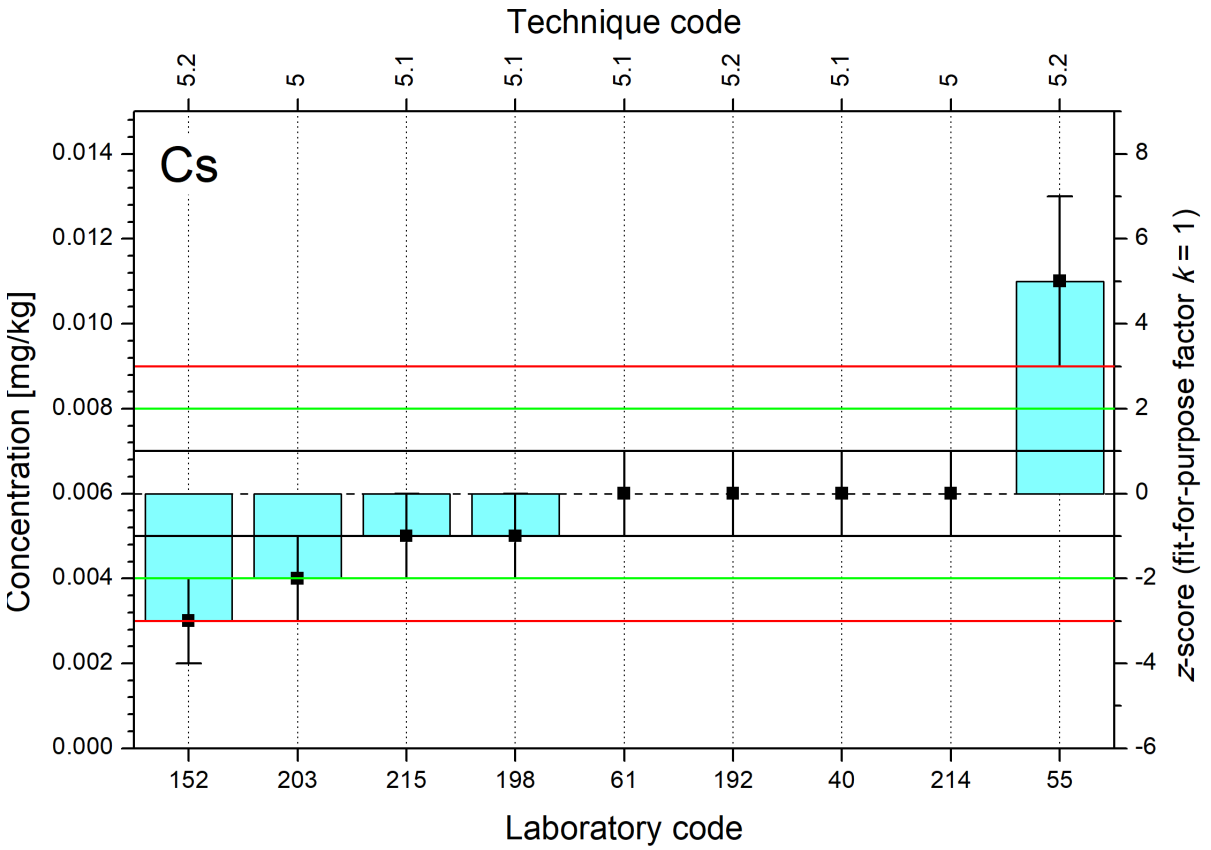

FIG. 35. Distributions of z-scores for analyte Cs (Land-Plant material).

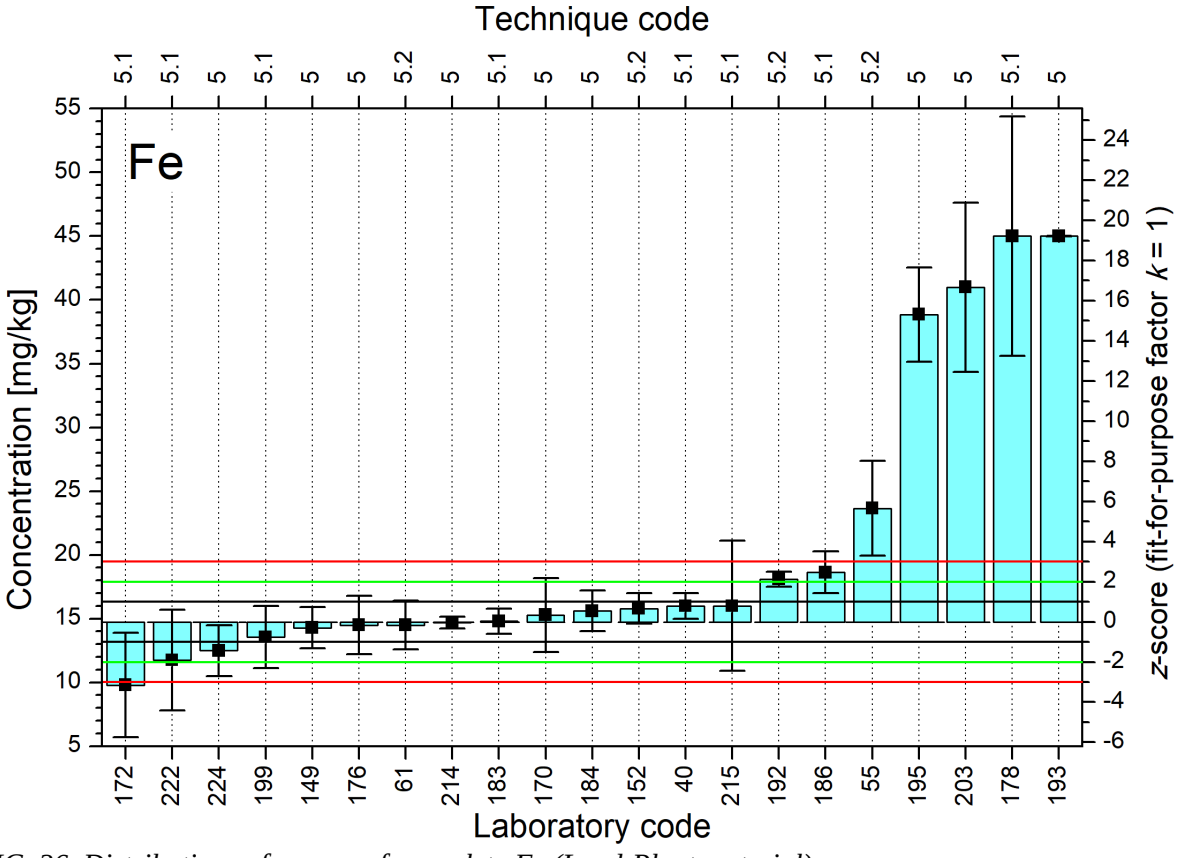

FIG. 36. Distributions of z-scores for analyte Fe (Land-Plant material).

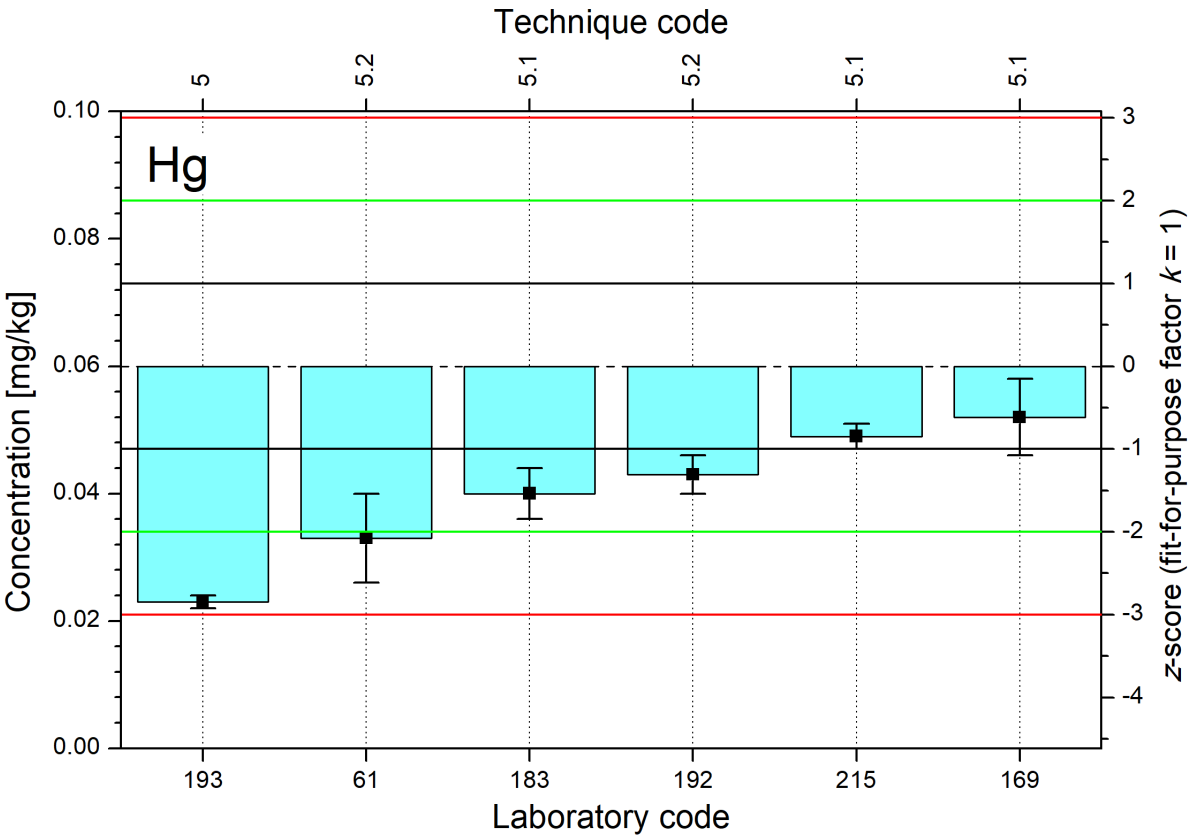

FIG. 37. Distributions of z-scores for analyte Hg (Land-Plant material).

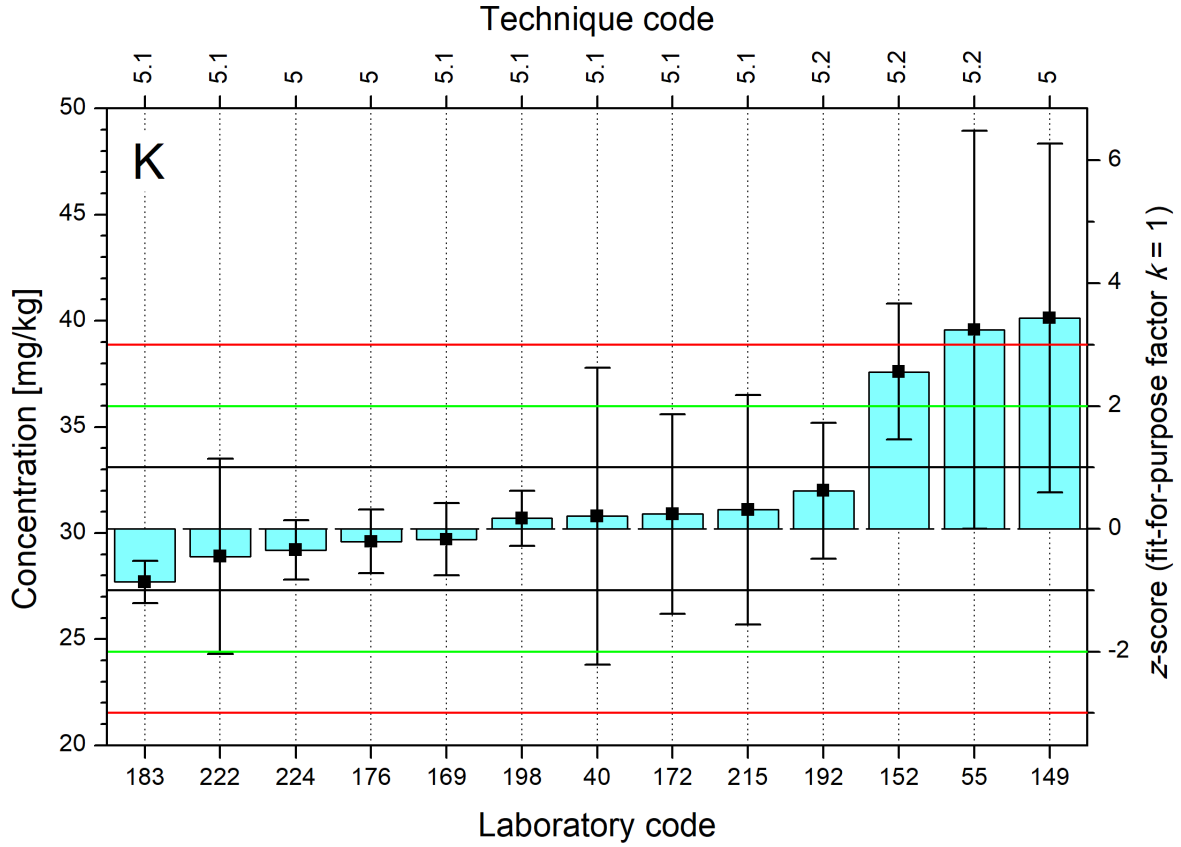

FIG. 38. Distributions of z-scores for analyte K (Land-Plant material).

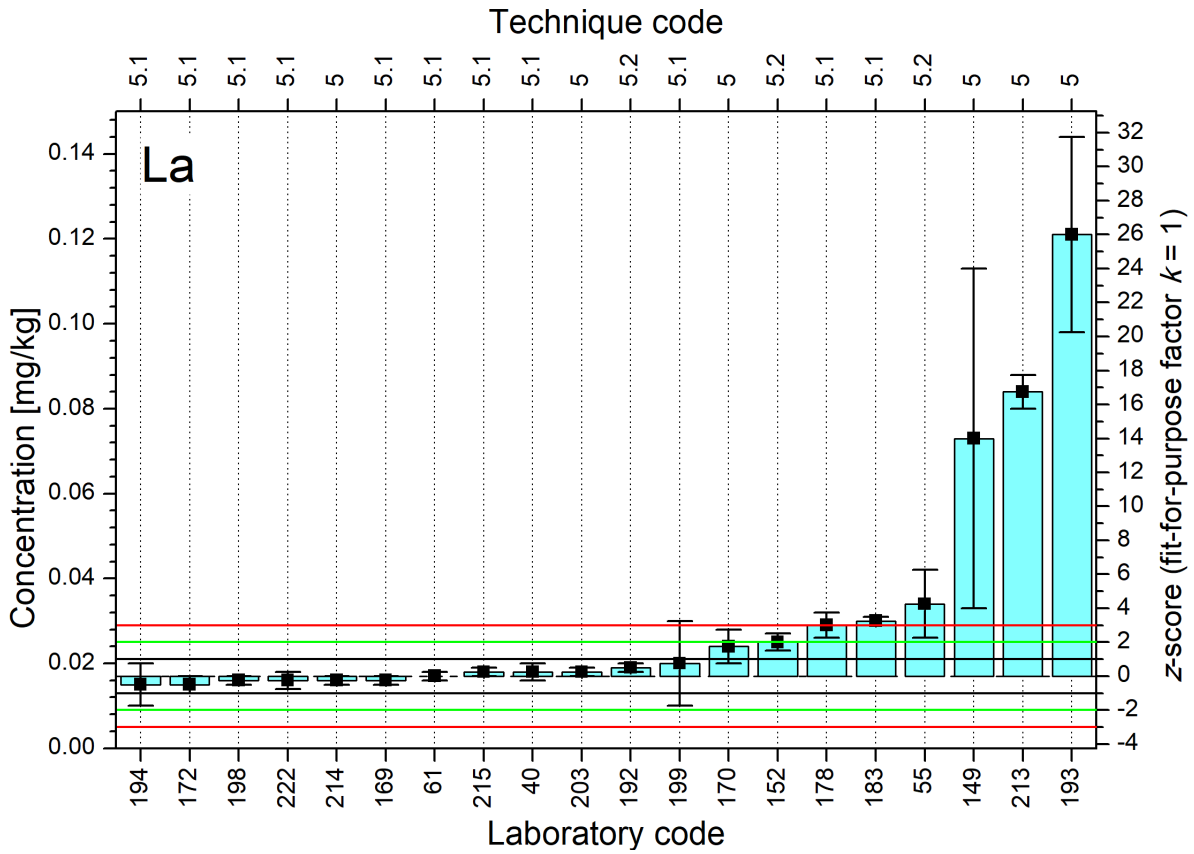

FIG. 39. Distributions of z-scores for analyte La (Land-Plant material).

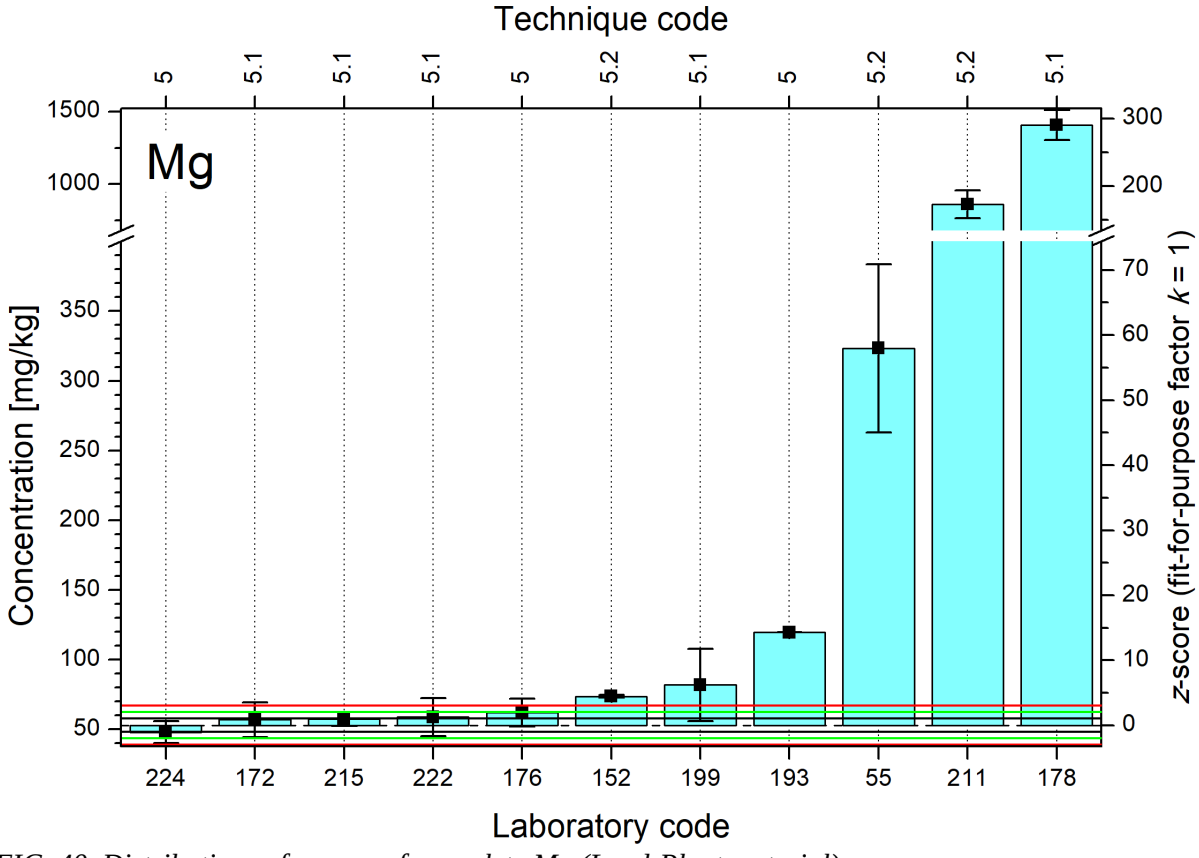

FIG. 40. Distributions of z-scores for analyte Mg (Land-Plant material).

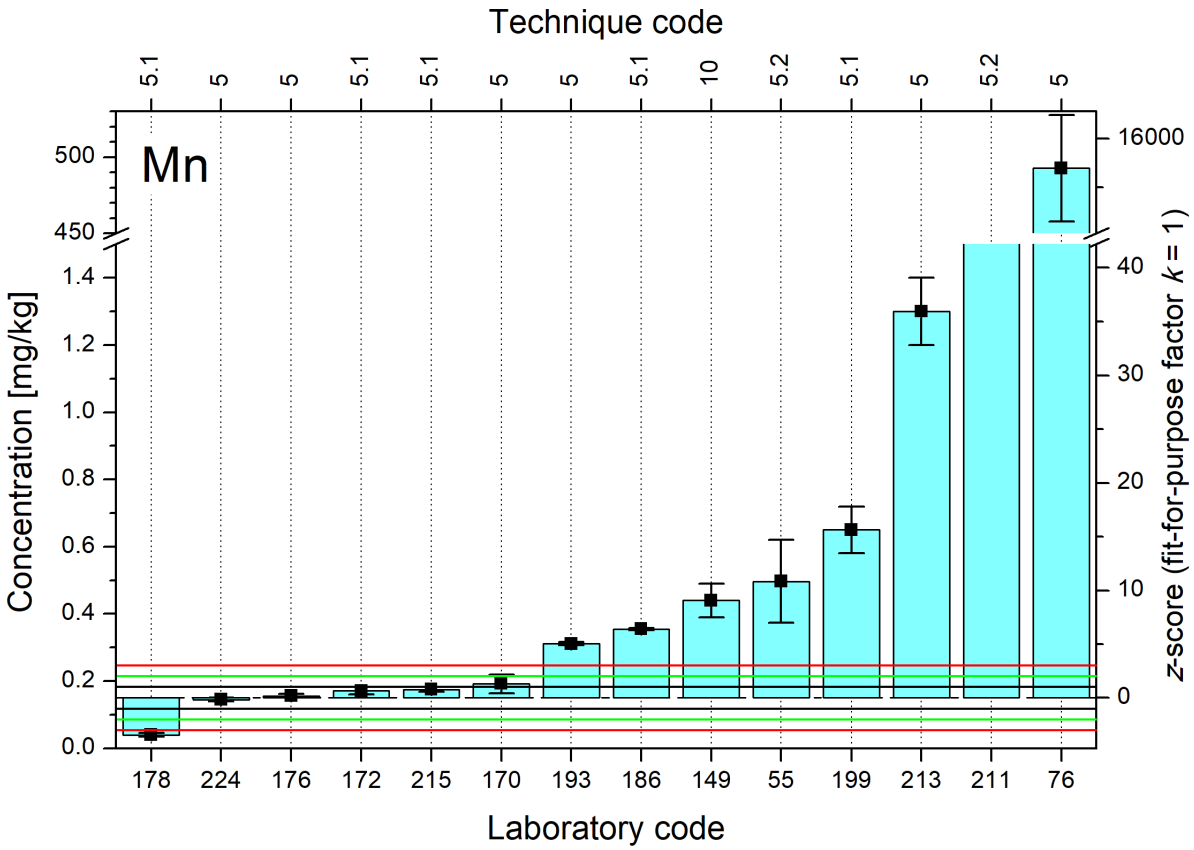

FIG. 41. Distributions of z-scores for analyte Mn (Land-Plant material).

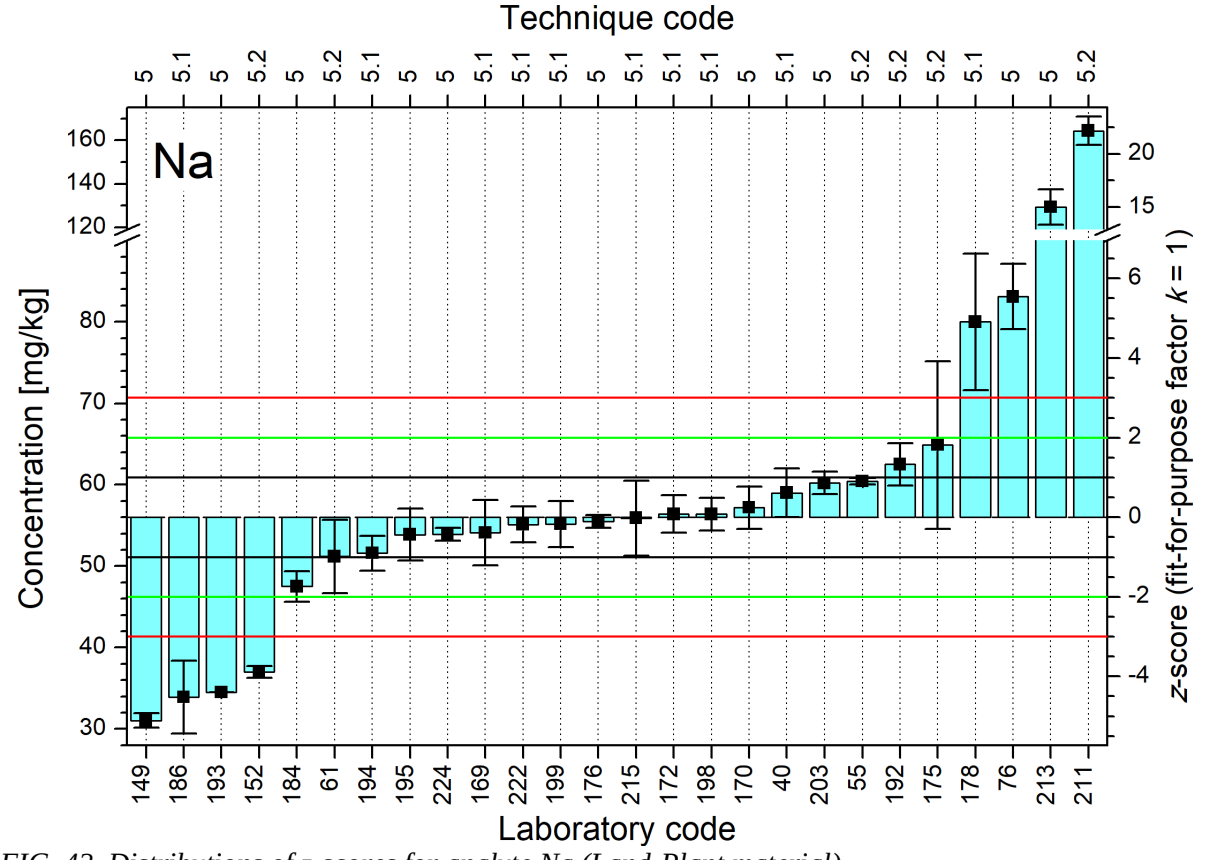

FIG. 42. Distributions of z-scores for analyte Na (Land-Plant material).

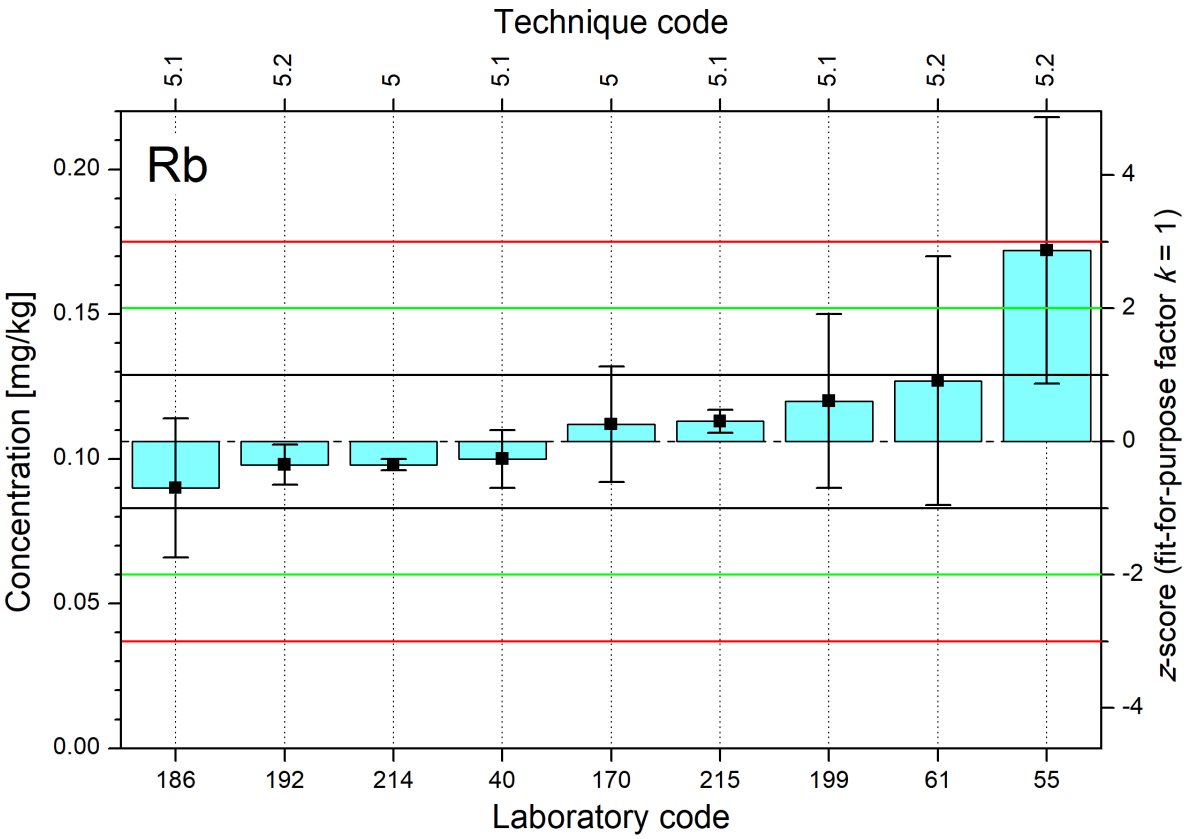

FIG. 43. Distributions of z-scores for analyte Rb (Land-Plant material).

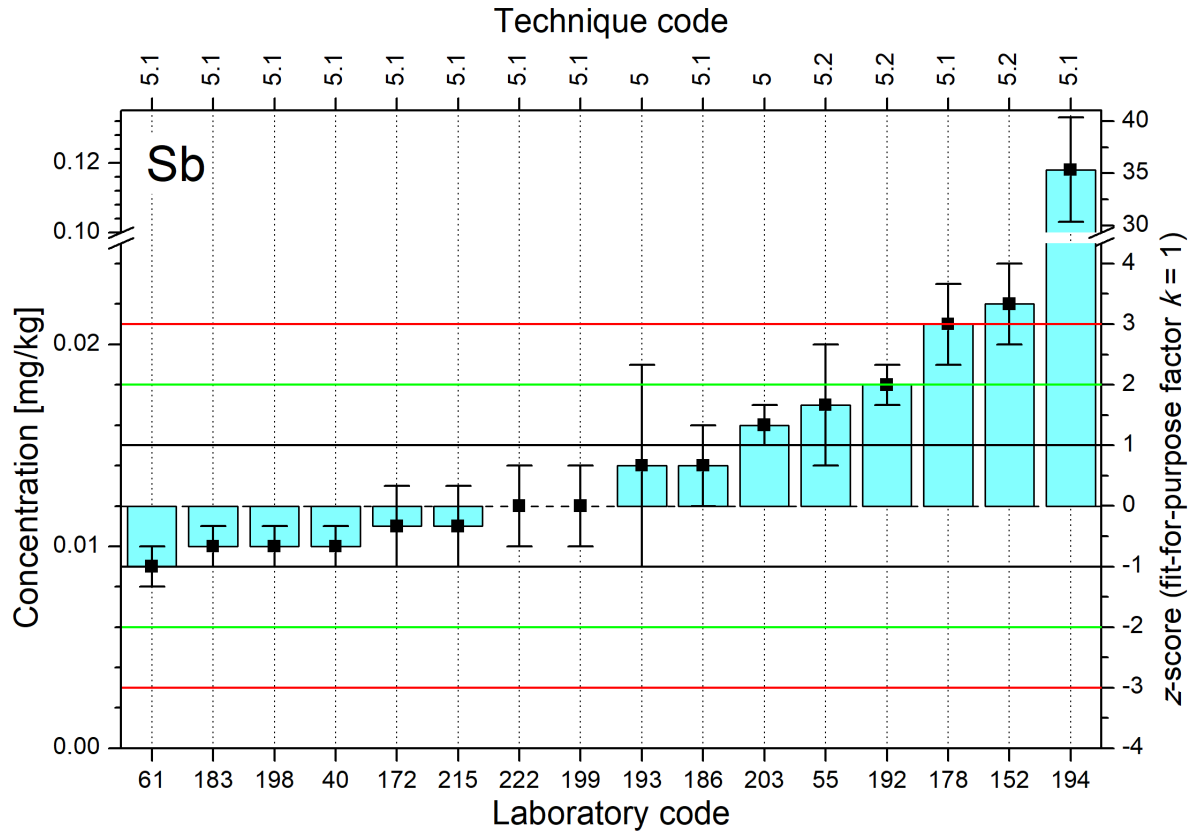

FIG. 44. Distributions of z-scores for analyte Sb (Land-Plant material).

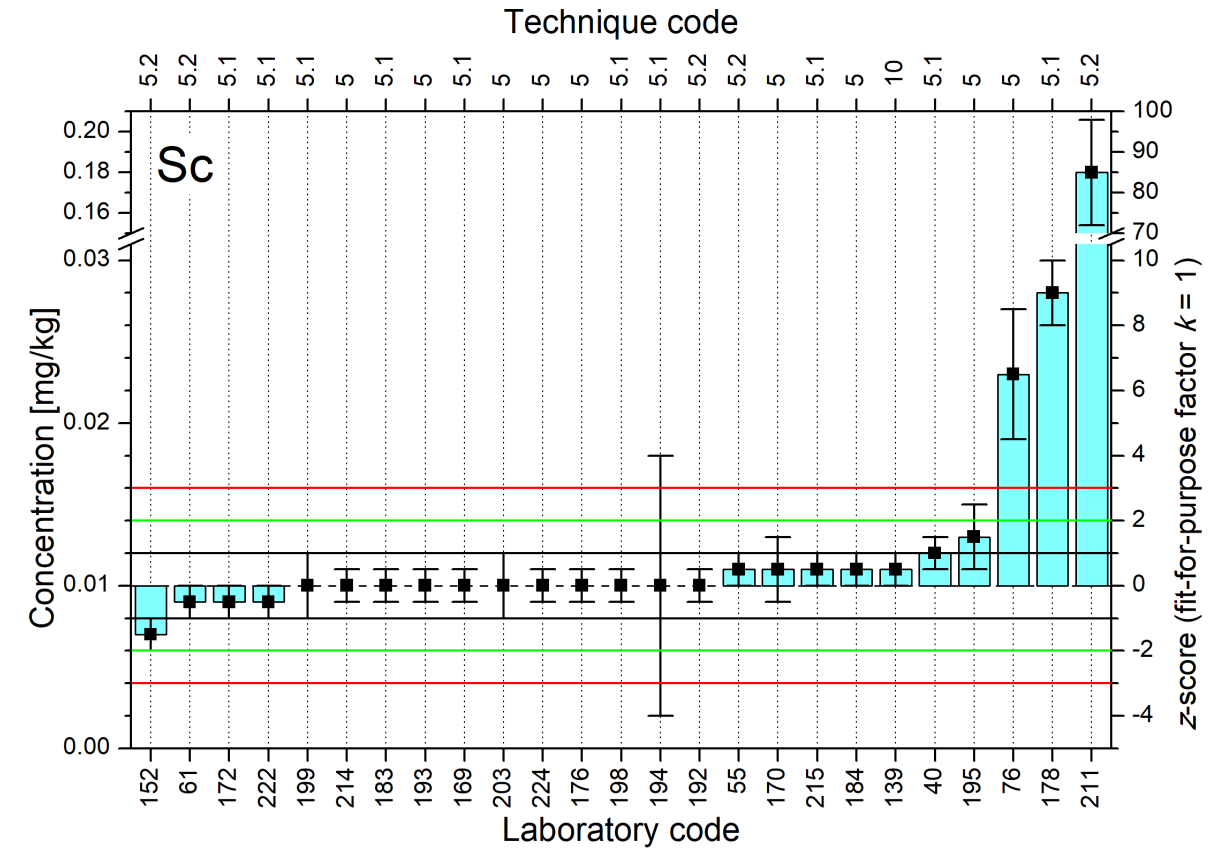

FIG. 45. Distributions of z-scores for analyte Sc (Land-Plant material).

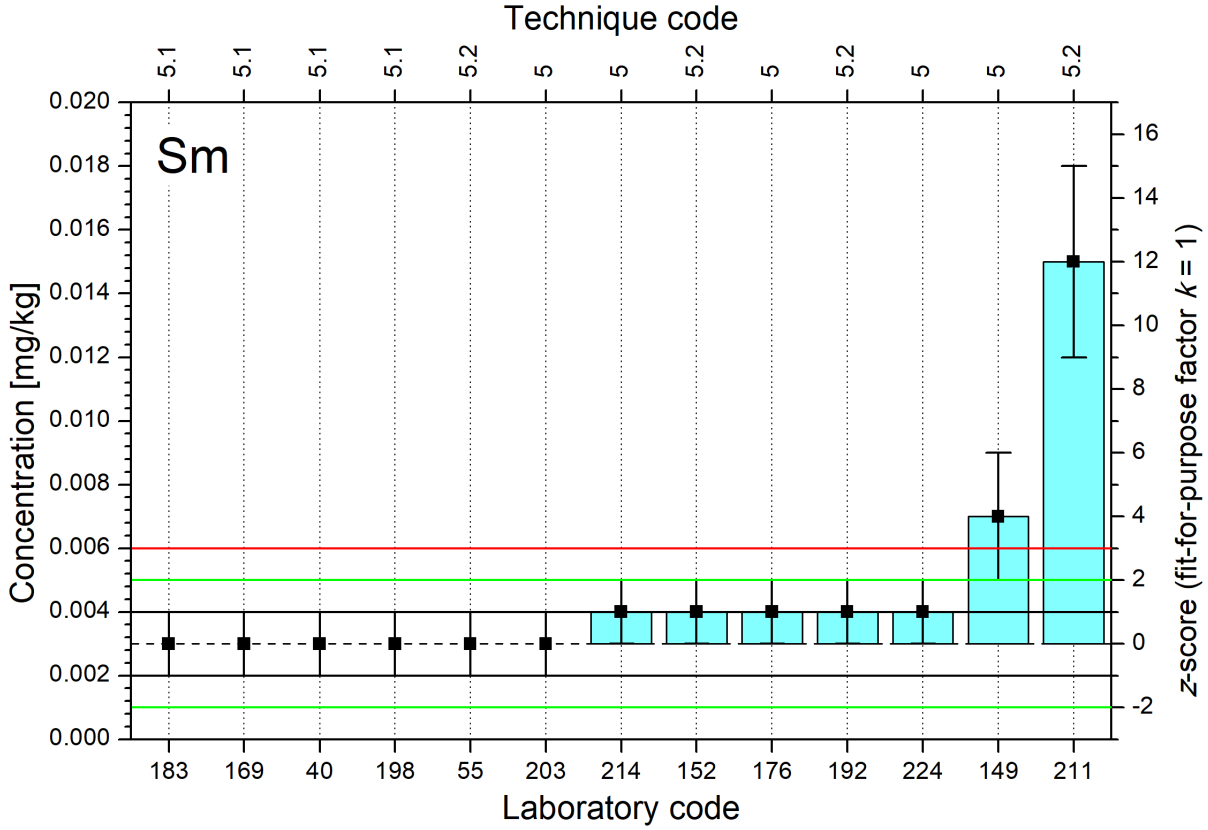

FIG. 46. Distributions of z-scores for analyte Sm (Land-Plant material).

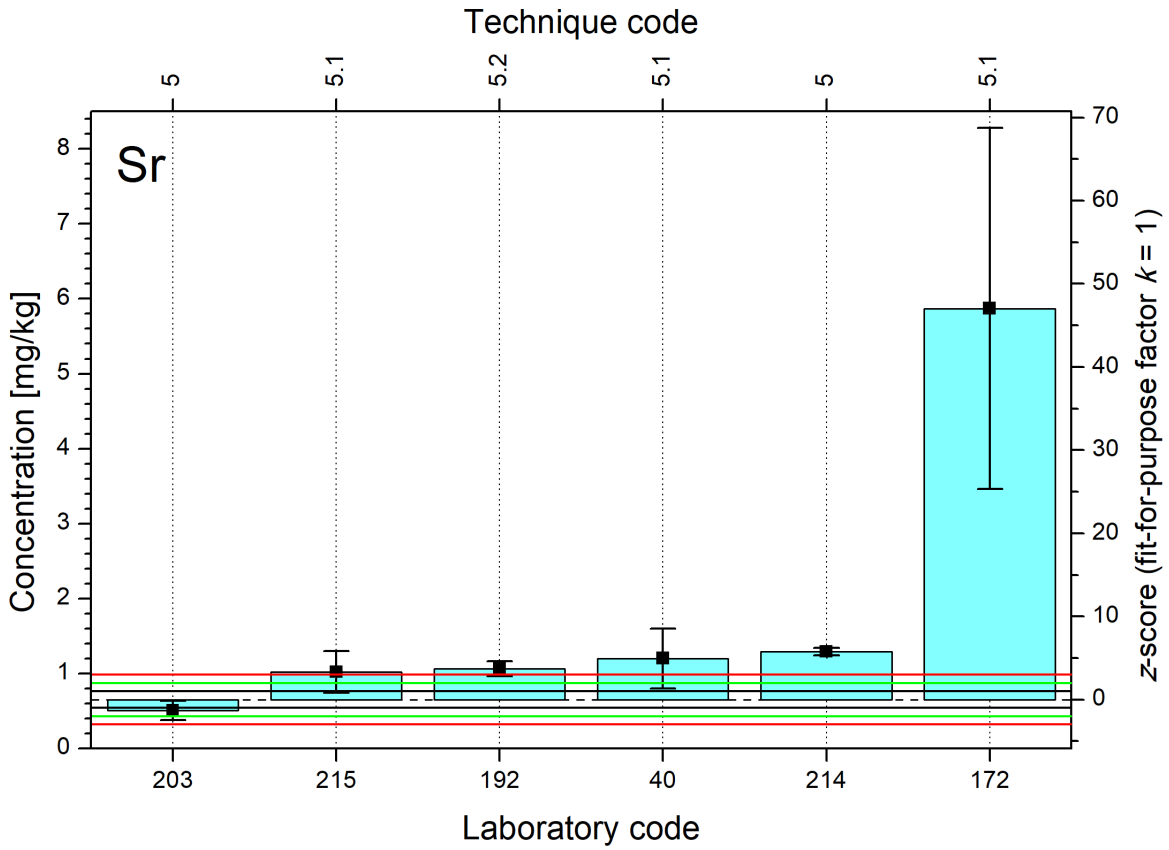

FIG. 47. Distributions of z-scores for analyte Sr (Land-Plant material).

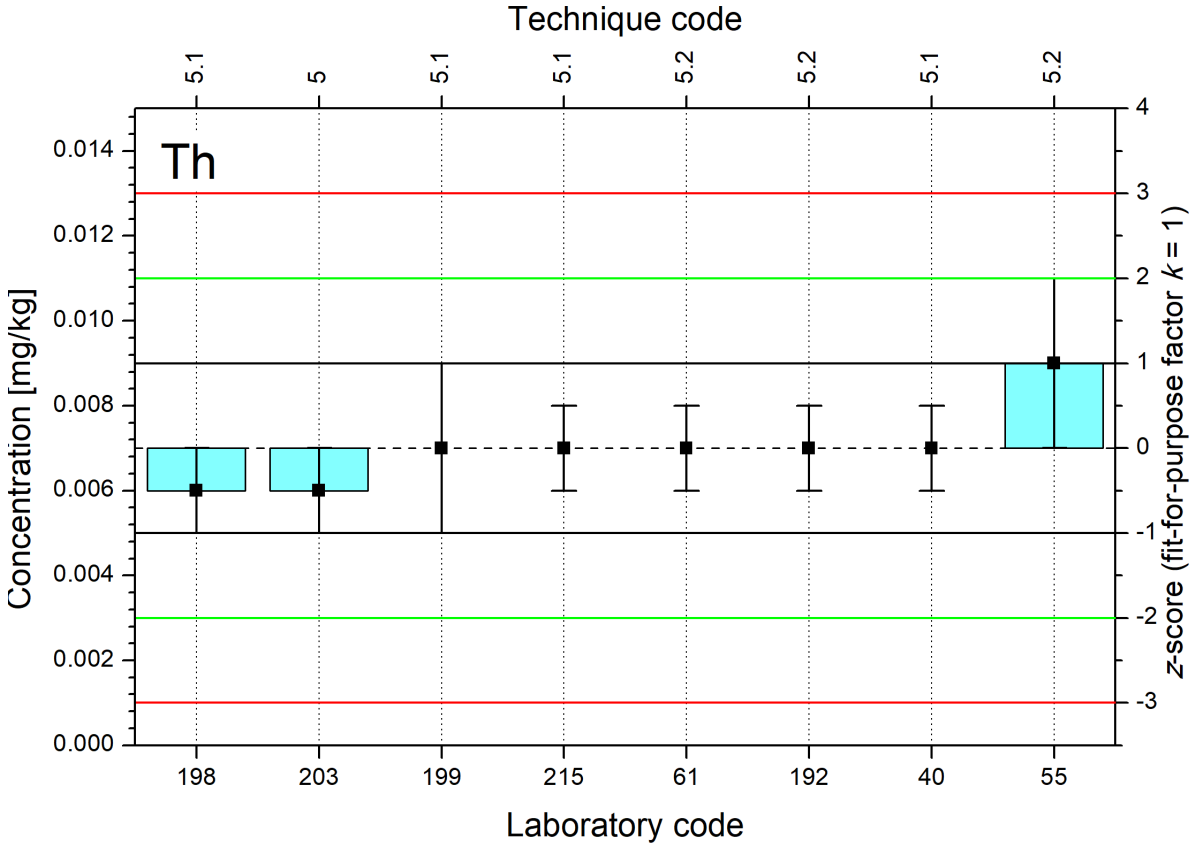

FIG. 48. Distributions of z-scores for analyte Th (Land-Plant material).

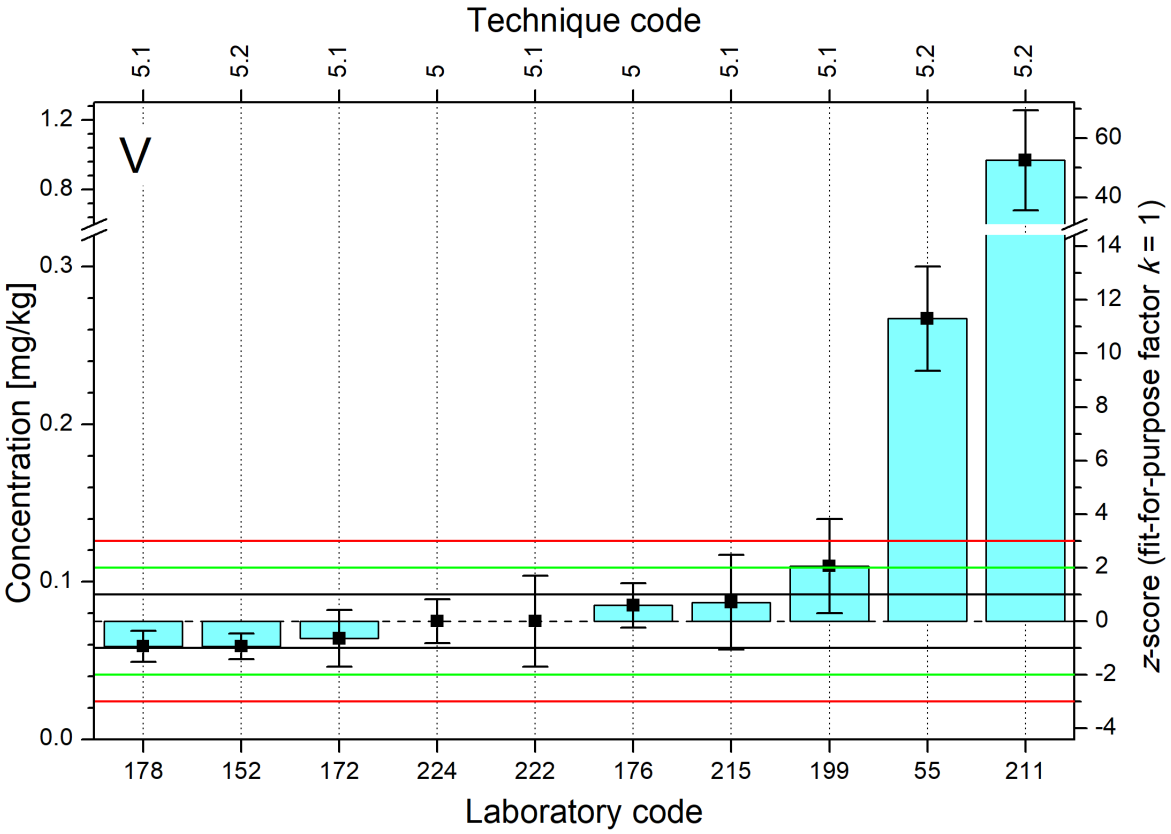

FIG. 49. Distributions of z-scores for analyte V (Land-Plant material).

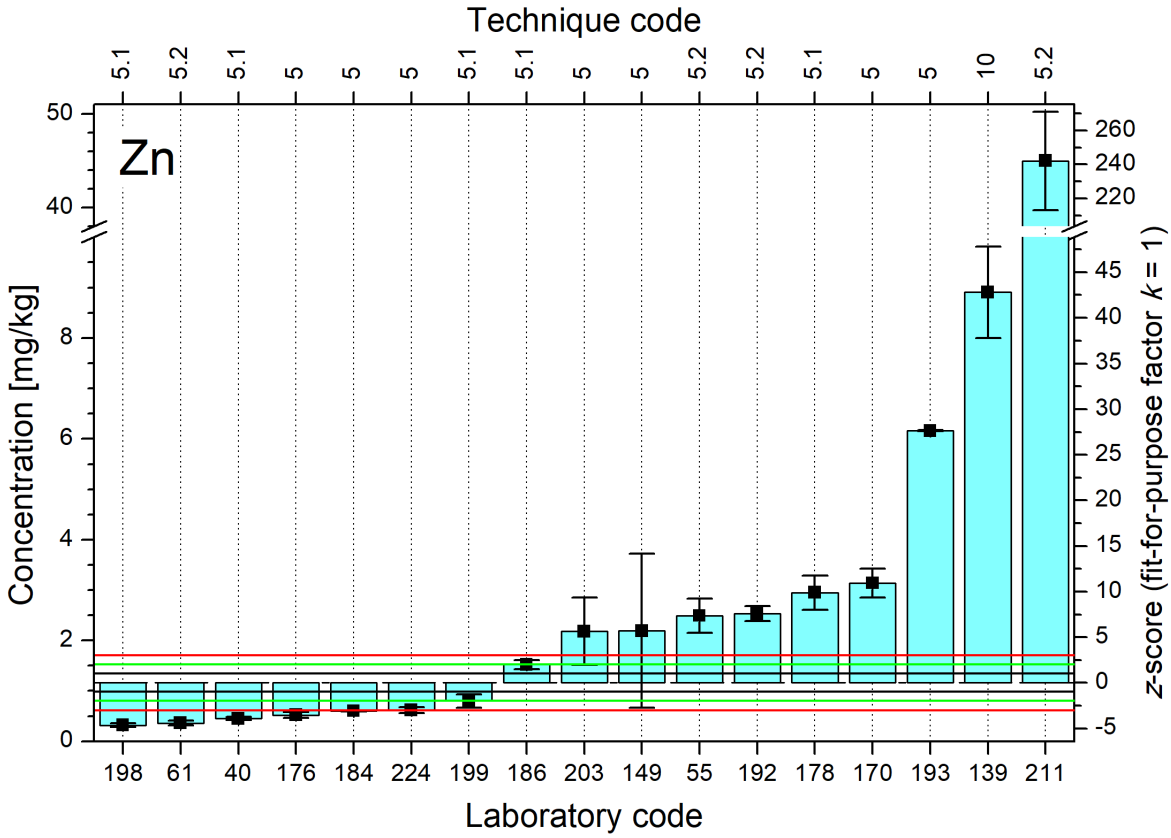

FIG. 50. Distributions of z-scores for analyte Zn (Land-Plant material).

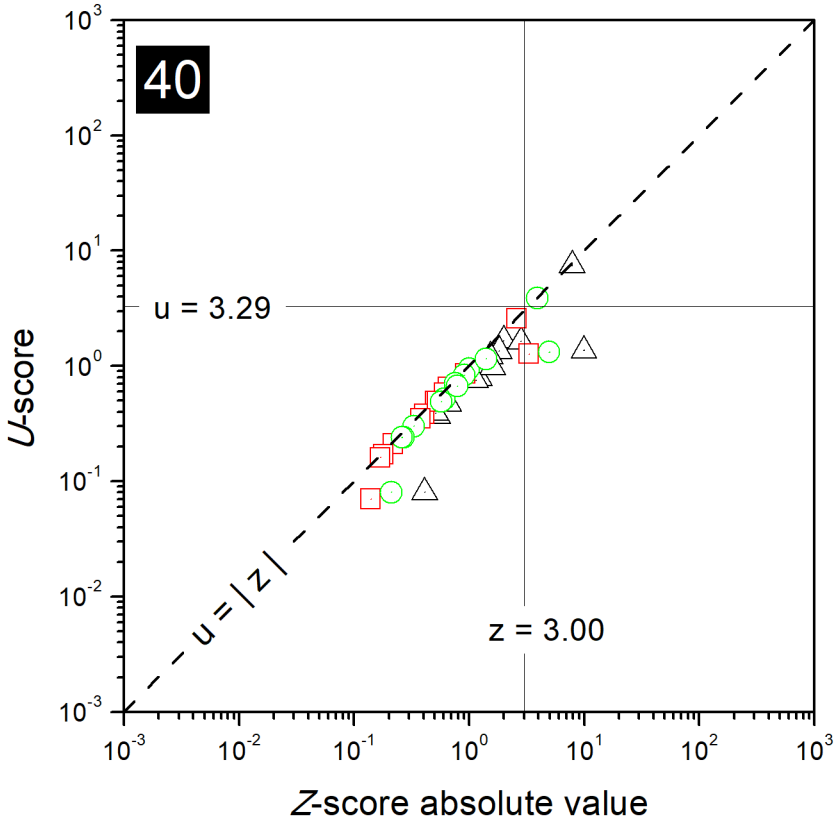

FIG. 51. Combined plots of z- and u-scores for the laboratory with code 40 (Land-Plant material).

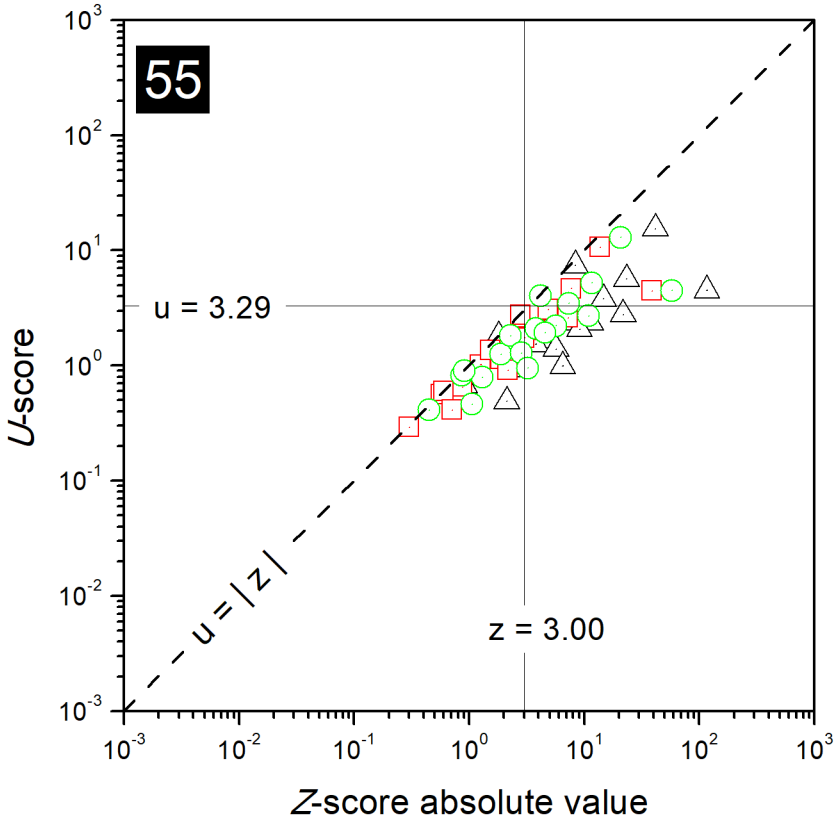

FIG. 52. Combined plots of z- and u-scores for the laboratory with code 55 (Land-Plant material).

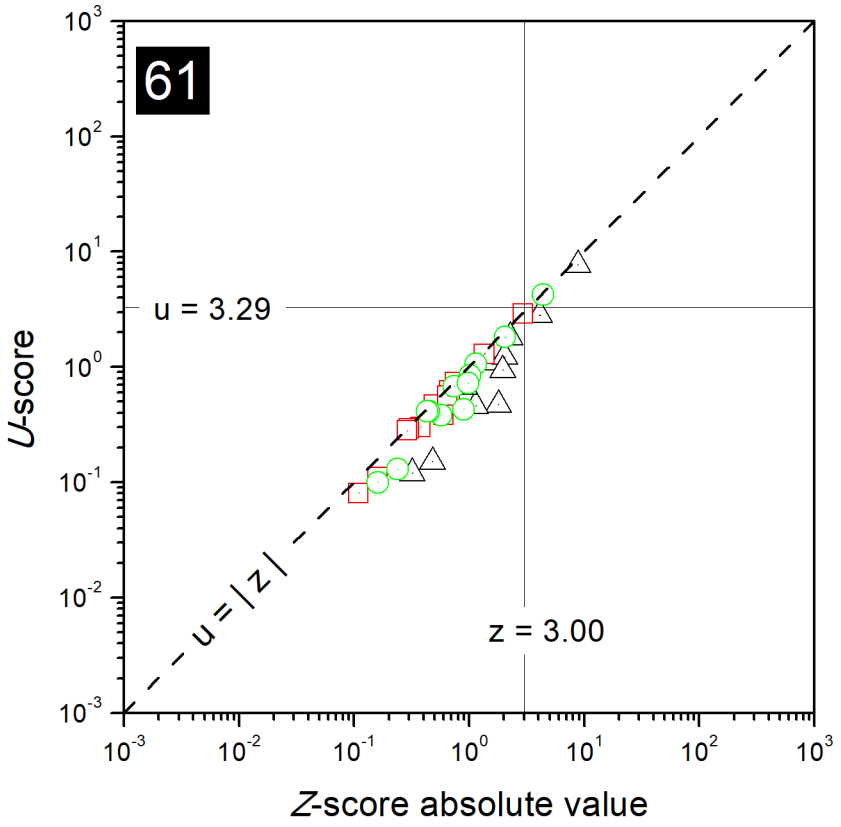

FIG. 53. Combined plots of z- and u-scores for the laboratory with code 61 (Land-Plant material).

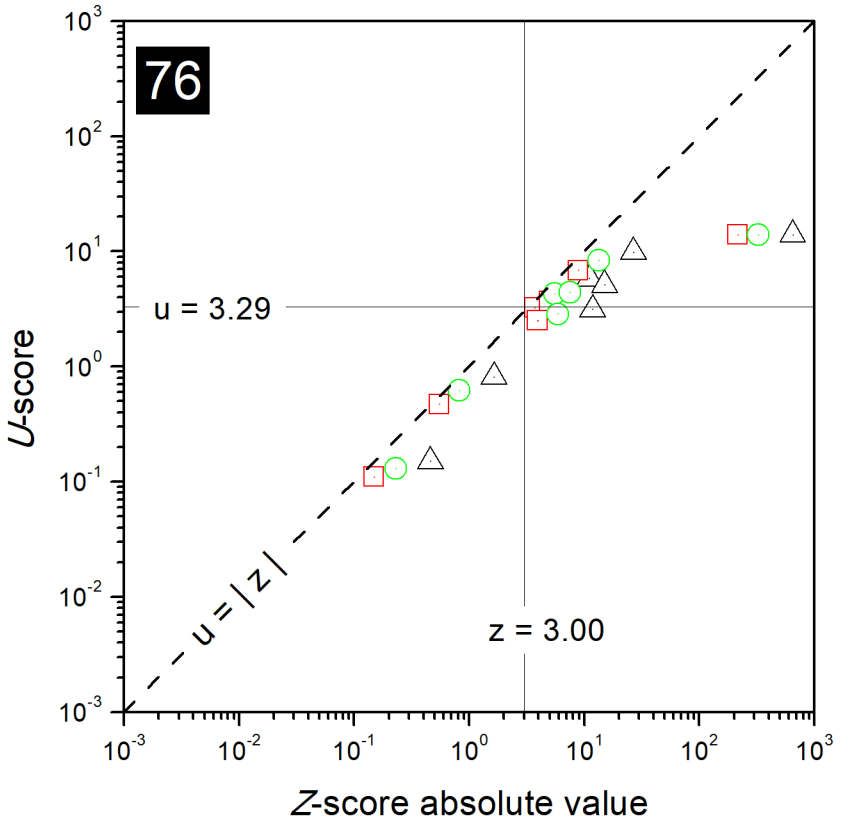

FIG. 54. Combined plots of z- and u-scores for the laboratory with code 76 (Land-Plant material).

- Combined plots of z- and u-scores (Land-plant material) -

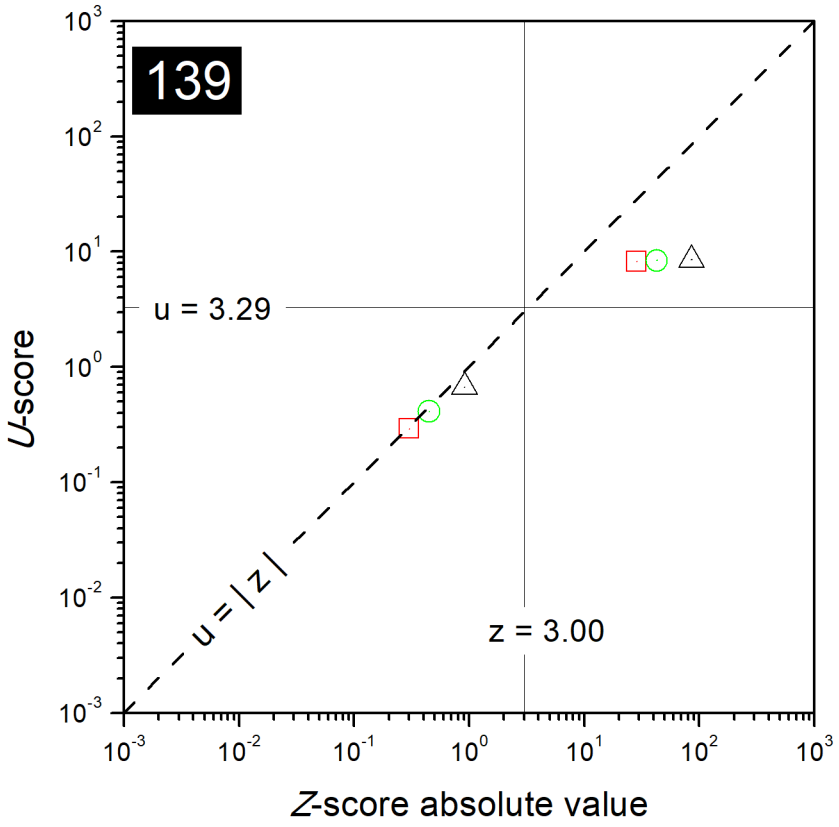

FIG. 55. Combined plots of z- and u-scores for the laboratory with code 139 (Land-Plant material).

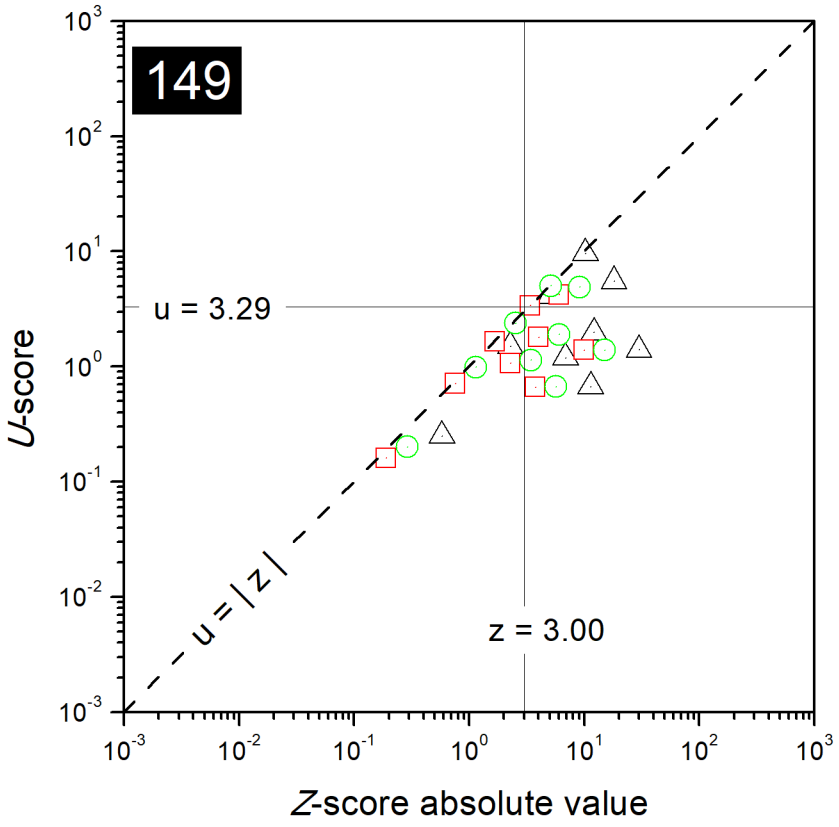

FIG. 56. Combined plots of z- and u-scores for the laboratory with code 149 (Land-Plant material).

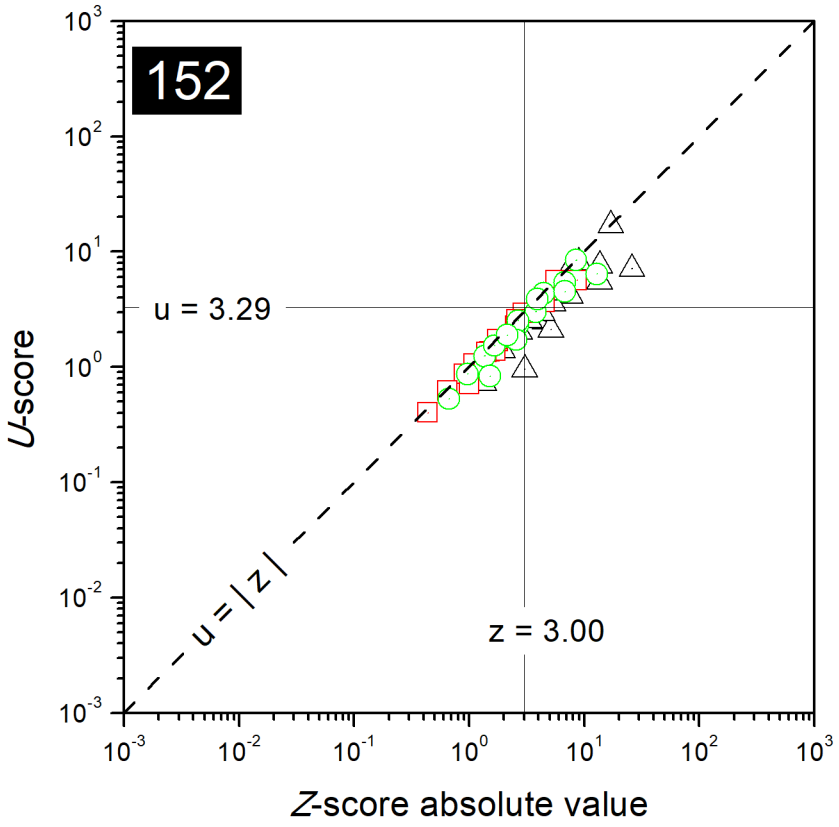

FIG. 57. Combined plots of z- and u-scores for the laboratory with code 152 (Land-Plant material).

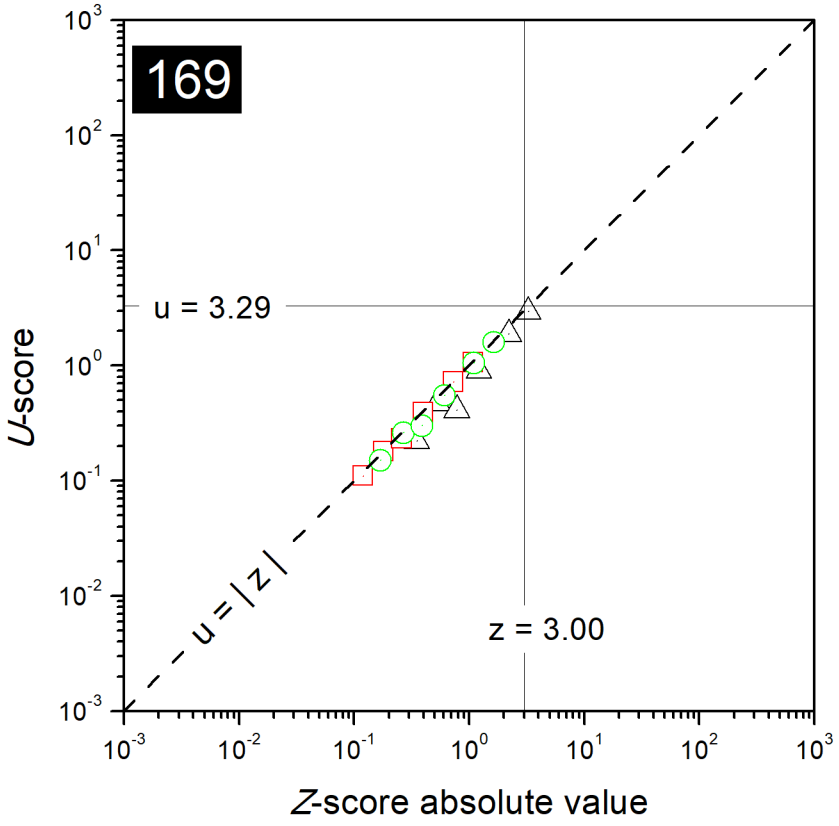

FIG. 58. Combined plots of z- and u-scores for the laboratory with code 169 (Land-Plant material).

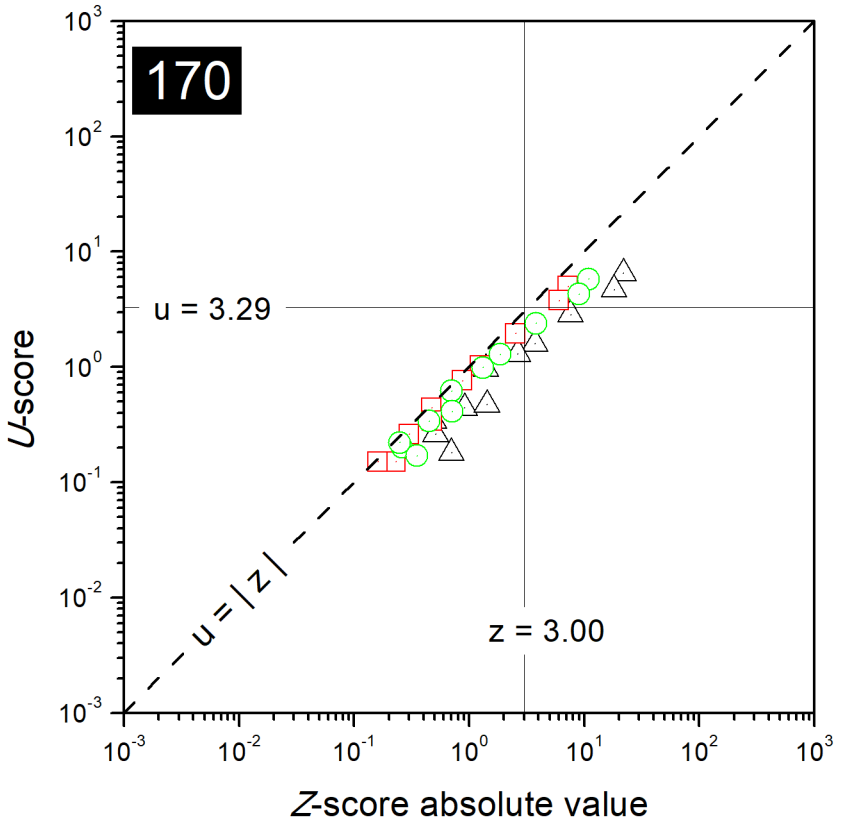

FIG. 59. Combined plots of z- and u-scores for the laboratory with code 170 (Land-Plant material).

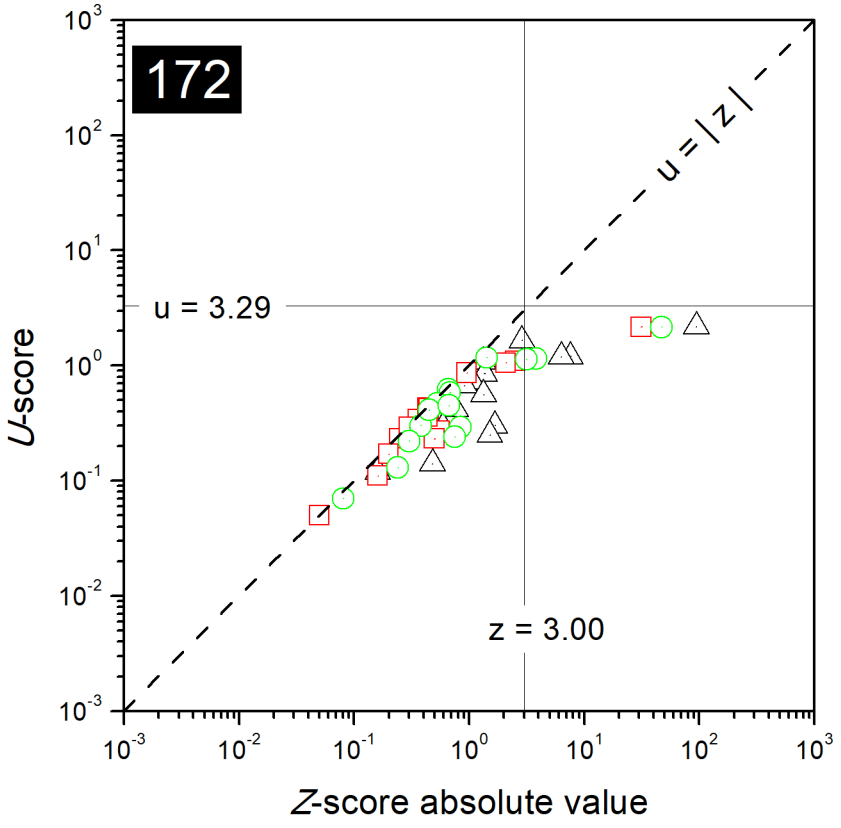

FIG. 60. Combined plots of z- and u-scores for the laboratory with code 172 (Land-Plant material).

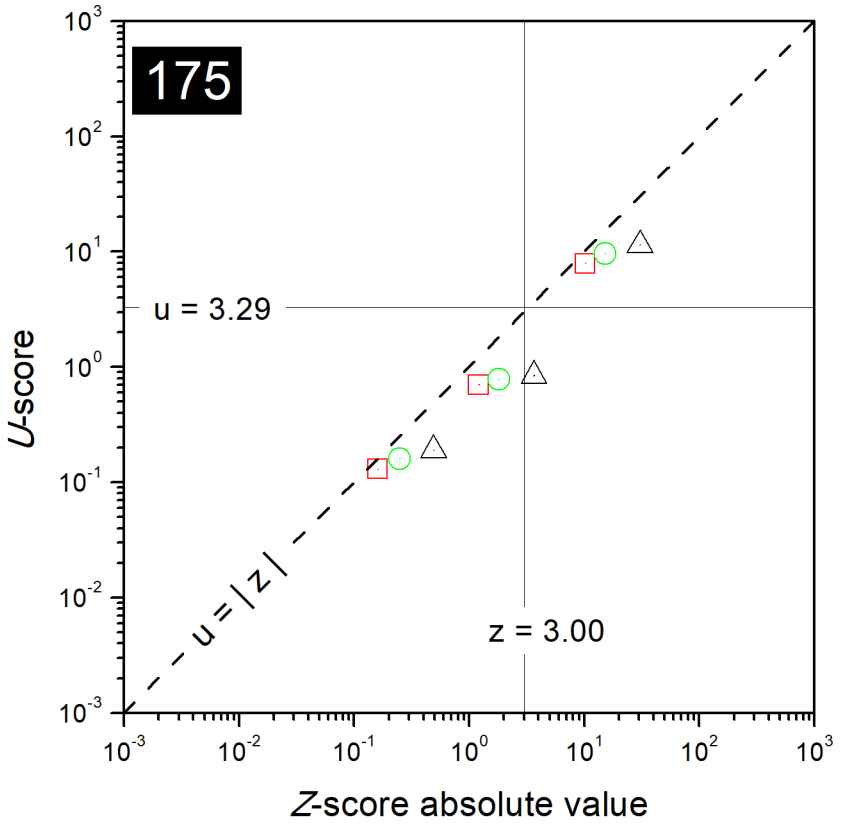

FIG. 61. Combined plots of z- and u-scores for the laboratory with code 175 (Land-Plant material).

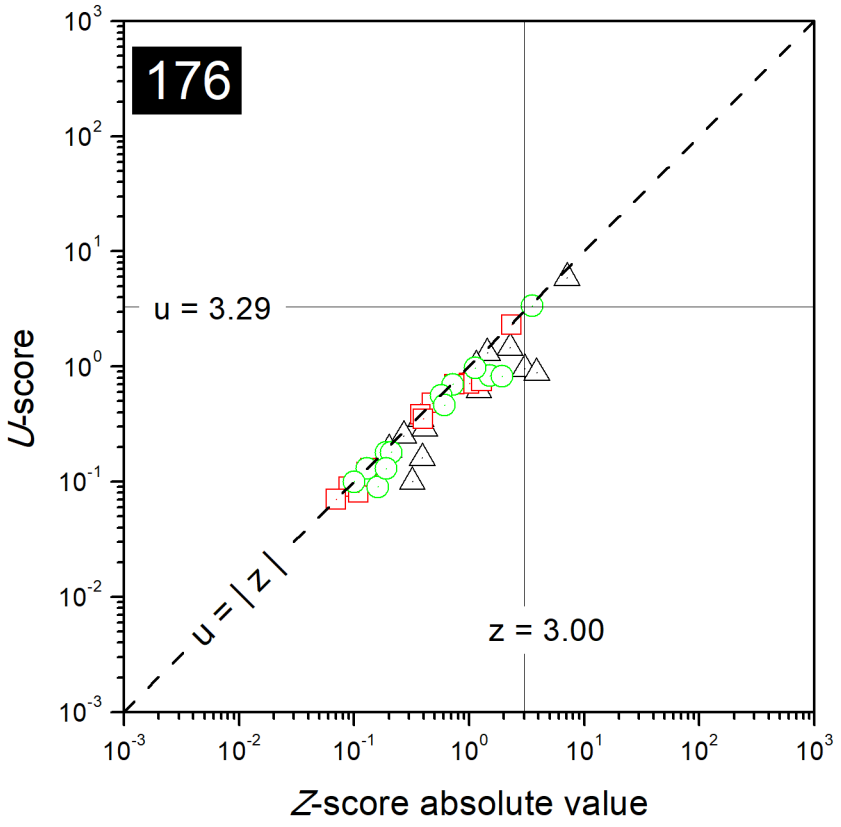

FIG. 62. Combined plots of z- and u-scores for the laboratory with code 176 (Land-Plant material).

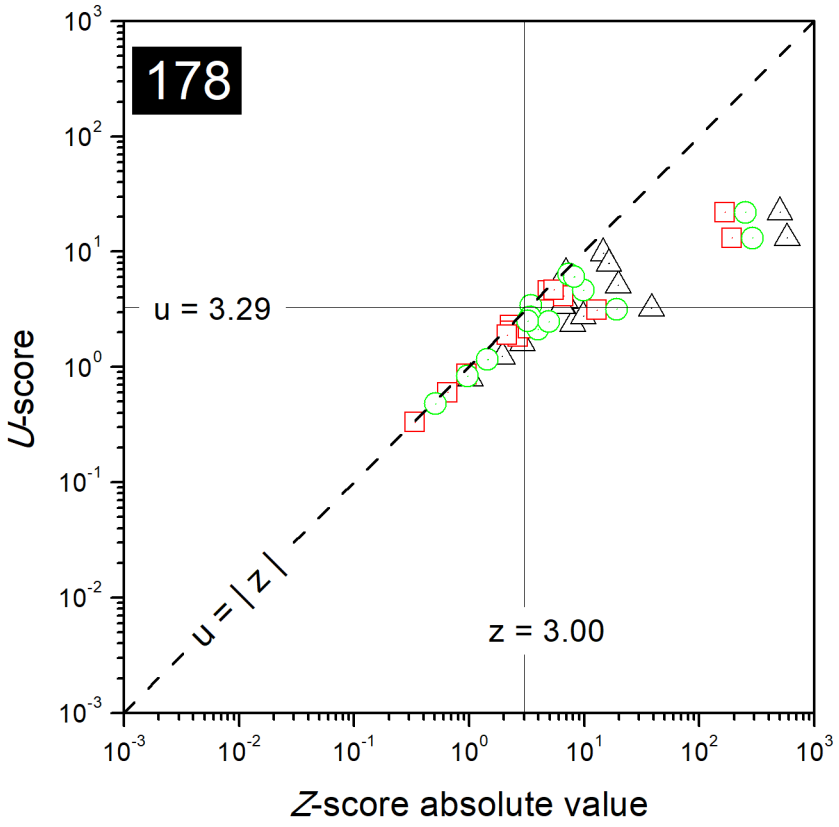

FIG. 63. Combined plots of z- and u-scores for the laboratory with code 178 (Land-Plant material).

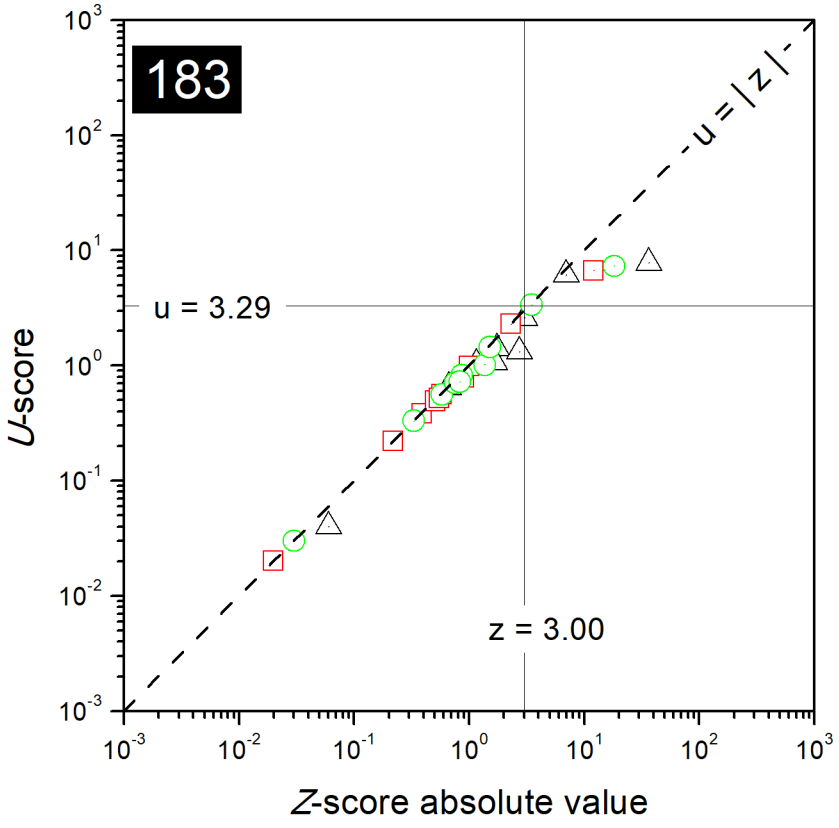

FIG. 64. Combined plots of z- and u-scores for the laboratory with code 183 (Land-Plant material).

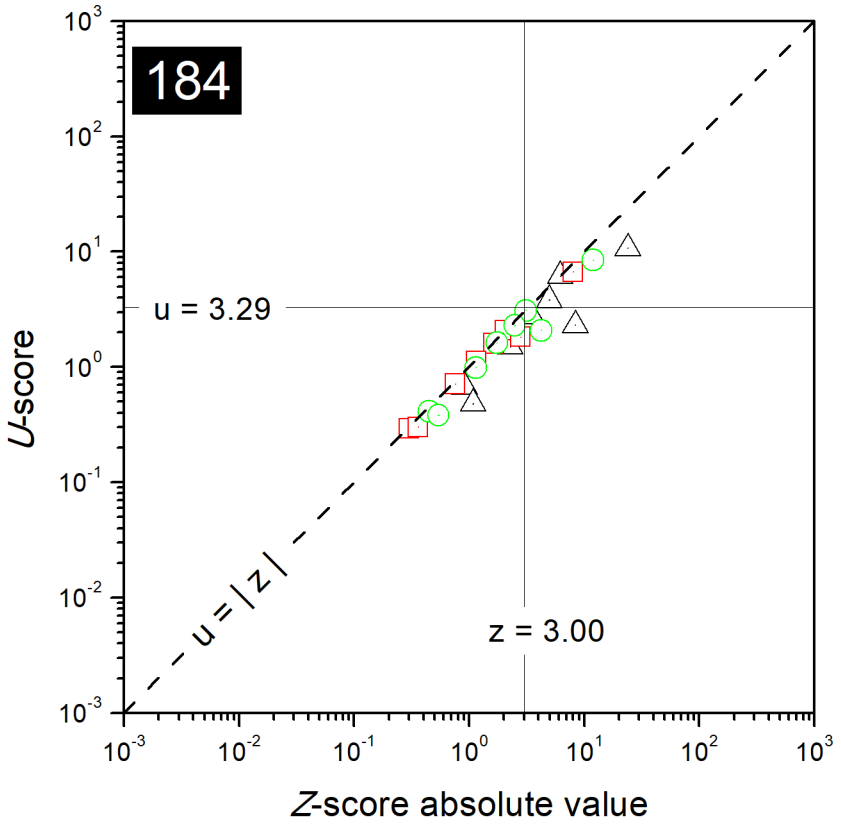

FIG. 65. Combined plots of z- and u-scores for the laboratory with code 184 (Land-Plant material).

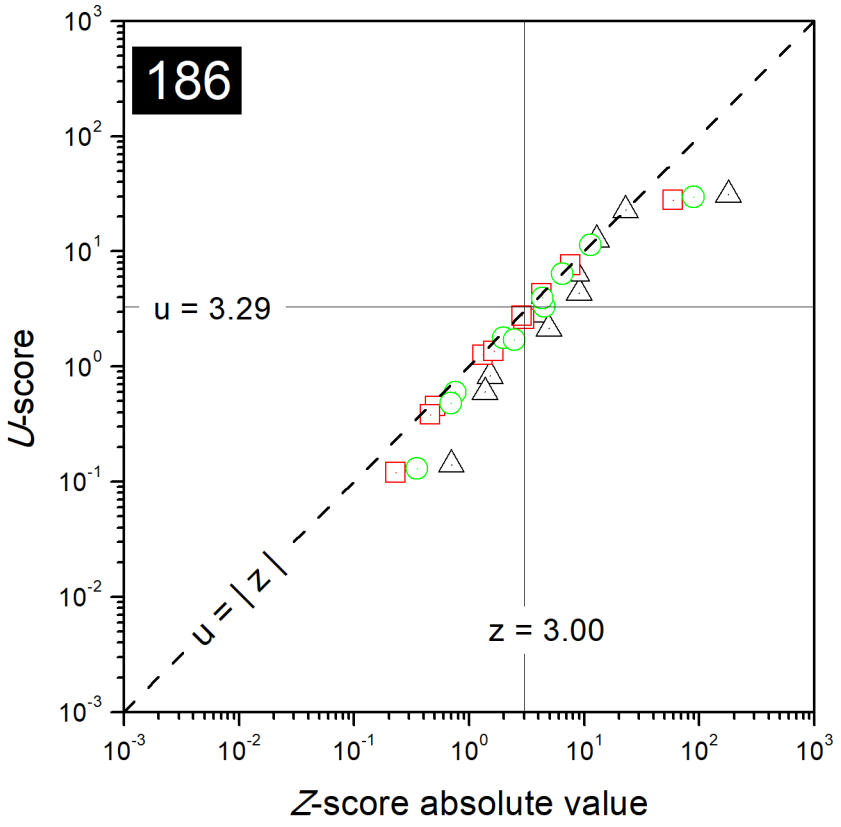

FIG. 66. Combined plots of z- and u-scores for the laboratory with code 186 (Land-Plant material).

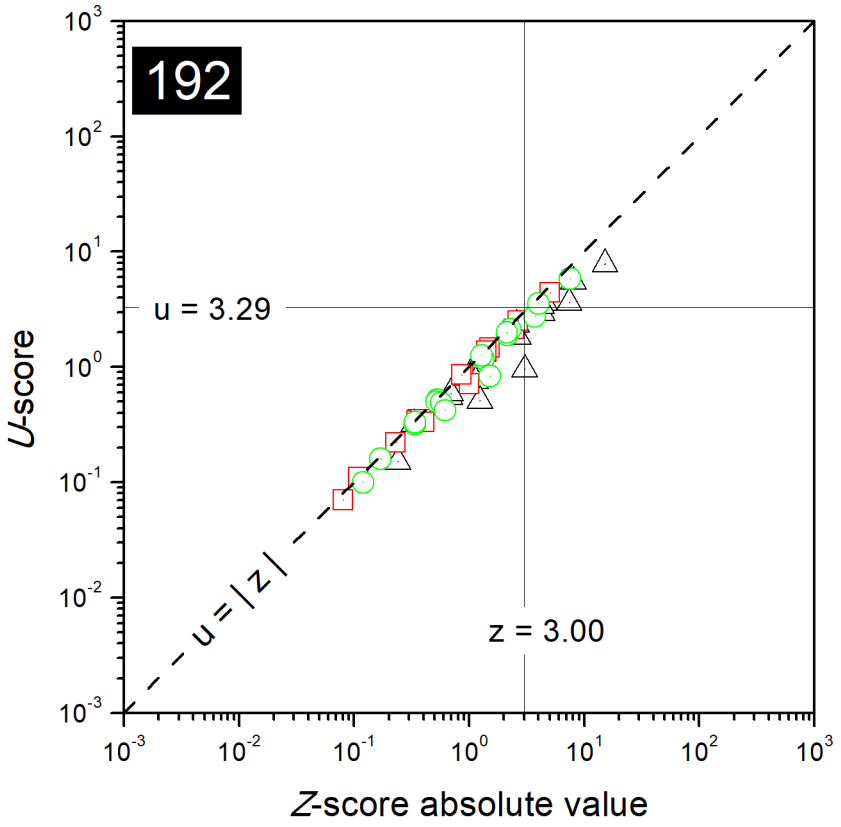

FIG. 67. Combined plots of z- and u-scores for the laboratory with code 192 (Land-Plant material).

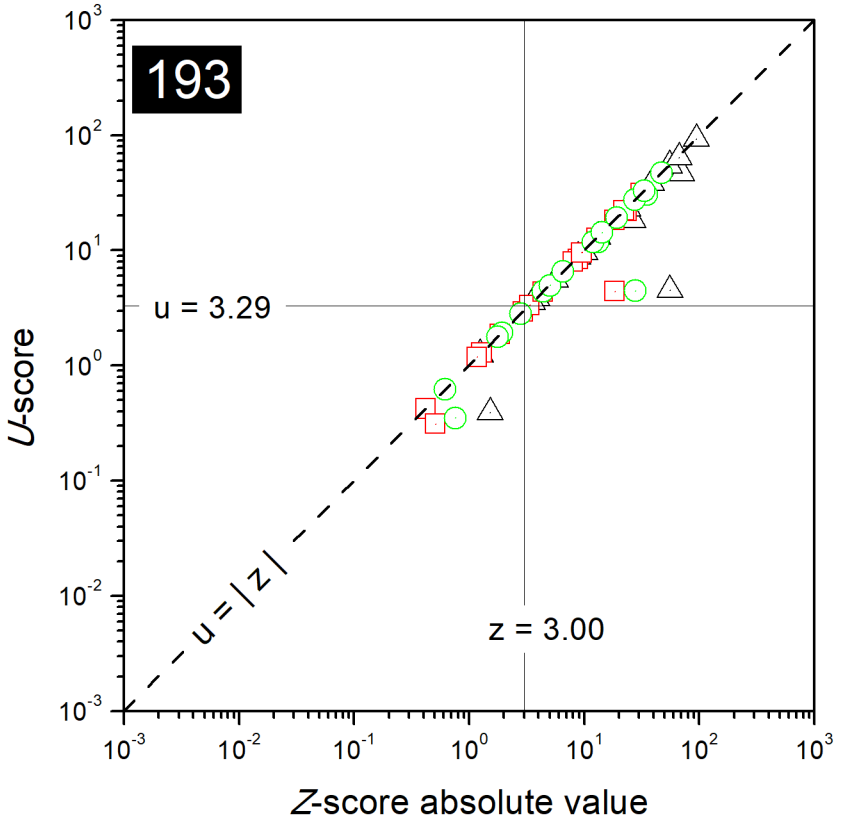

FIG. 68. Combined plots of z- and u-scores for the laboratory with code 193 (Land-Plant material).

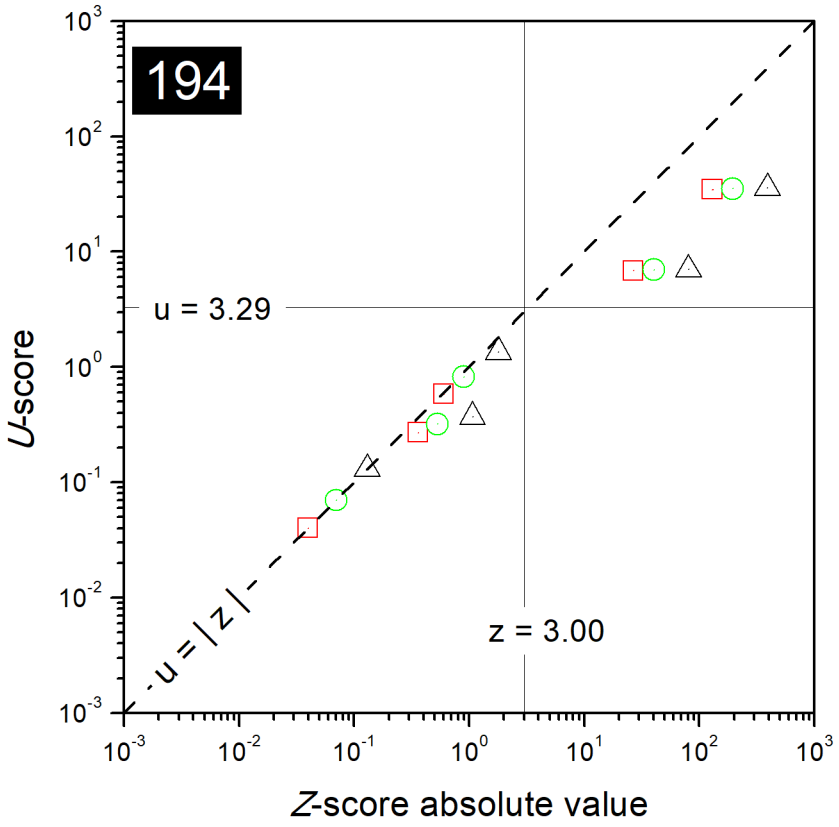

FIG. 69. Combined plots of z- and u-scores for the laboratory with code 194 (Land-Plant material).

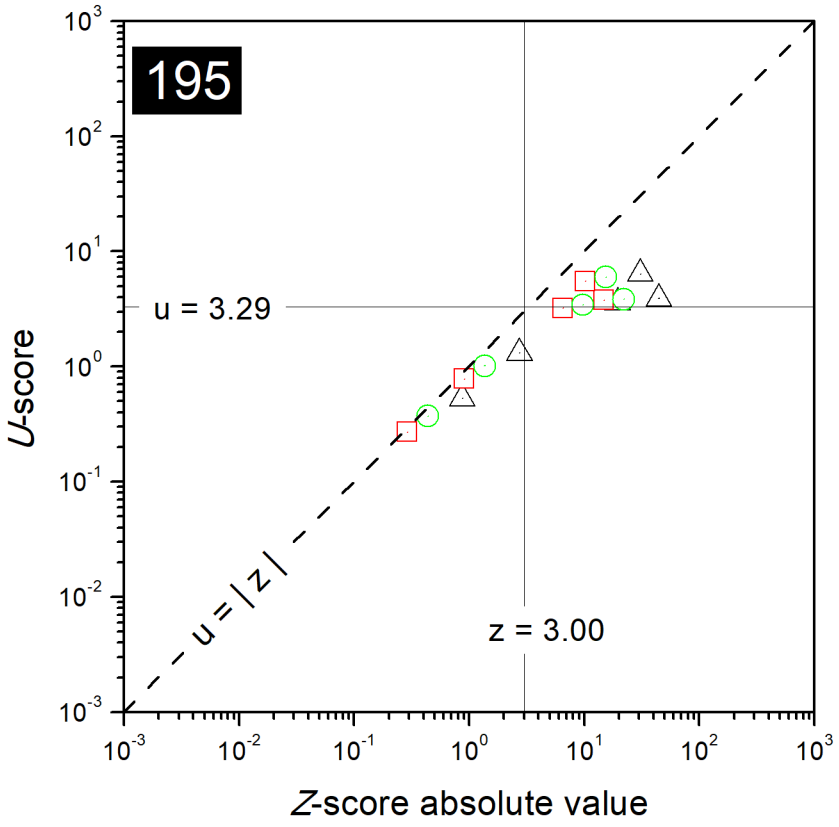

FIG. 70. Combined plots of z- and u-scores for the laboratory with code 195 (Land-Plant material).

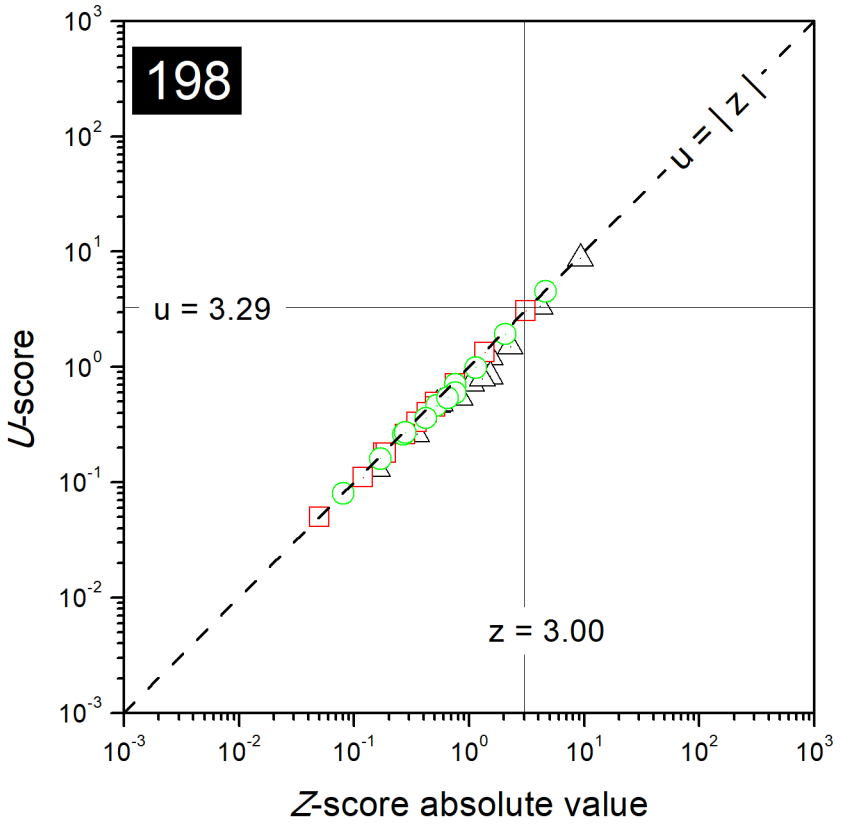

FIG. 71. Combined plots of z- and u-scores for the laboratory with code 198 (Land-Plant material).

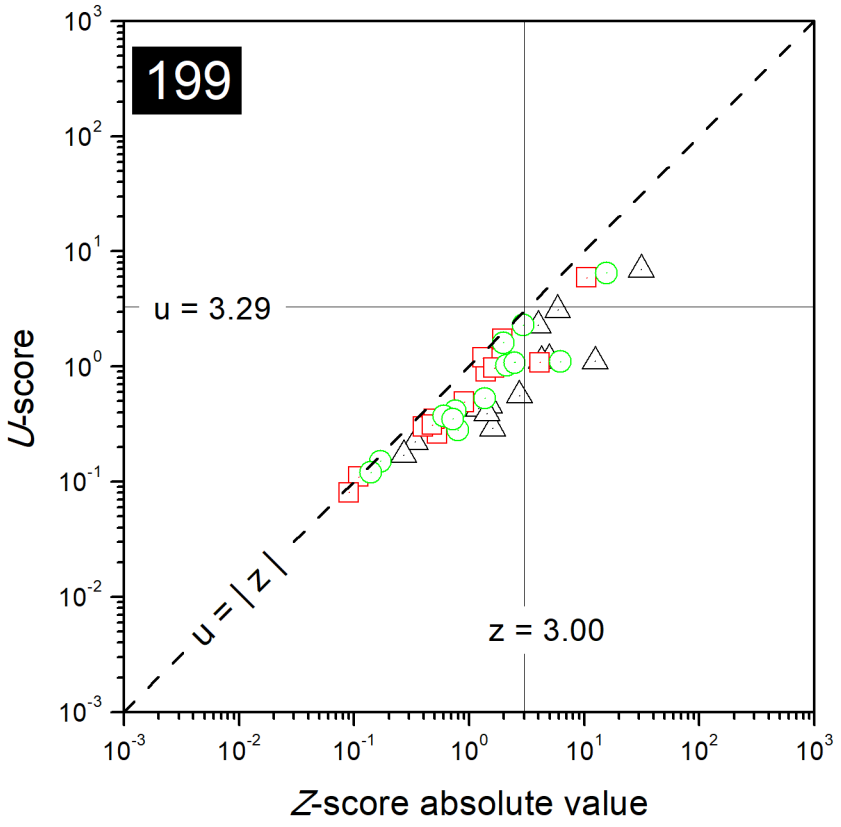

FIG. 72. Combined plots of z- and u-scores for the laboratory with code 199 (Land-Plant material).

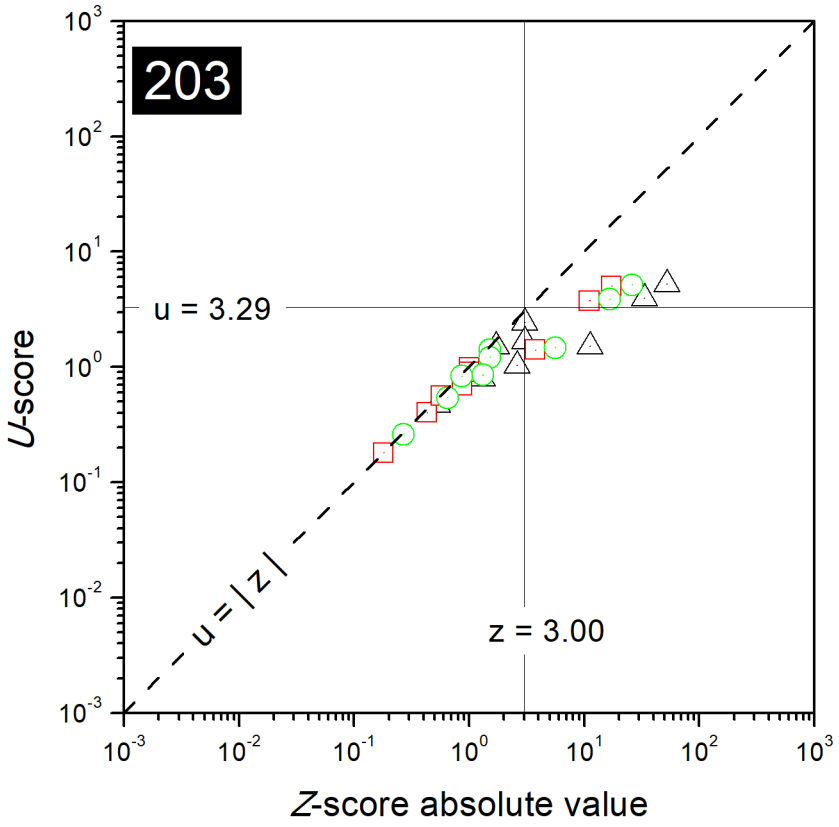

FIG. 73. Combined plots of z- and u-scores for the laboratory with code 203 (Land-Plant material).

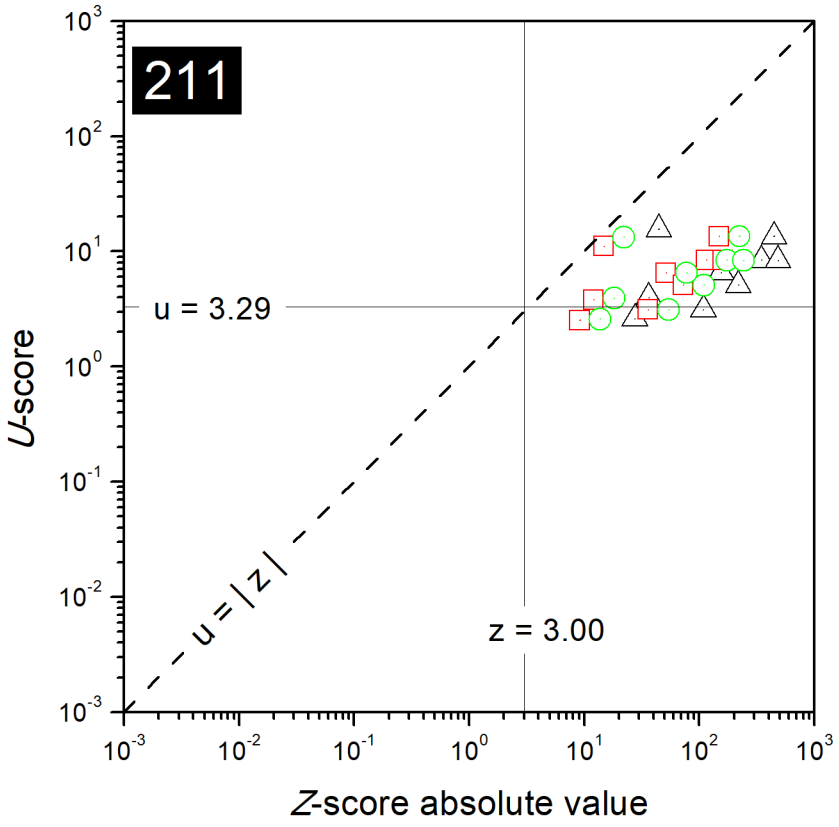

FIG. 74. Combined plots of z- and u-scores for the laboratory with code 211 (Land-Plant material).

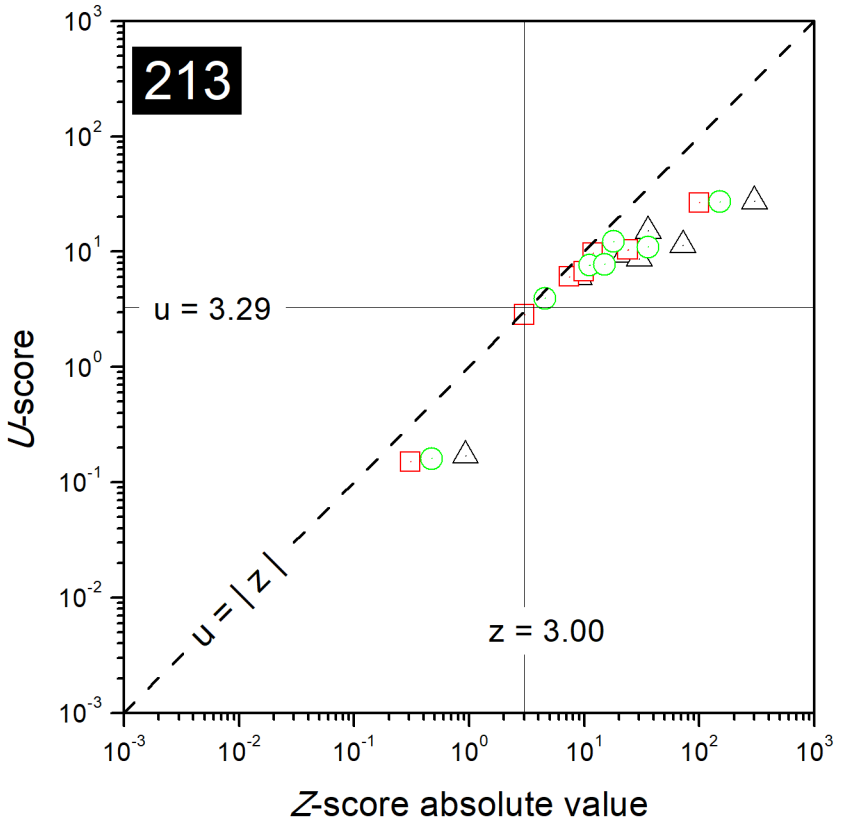

FIG. 75. Combined plots of z- and u-scores for the laboratory with code 213 (Land-Plant material).

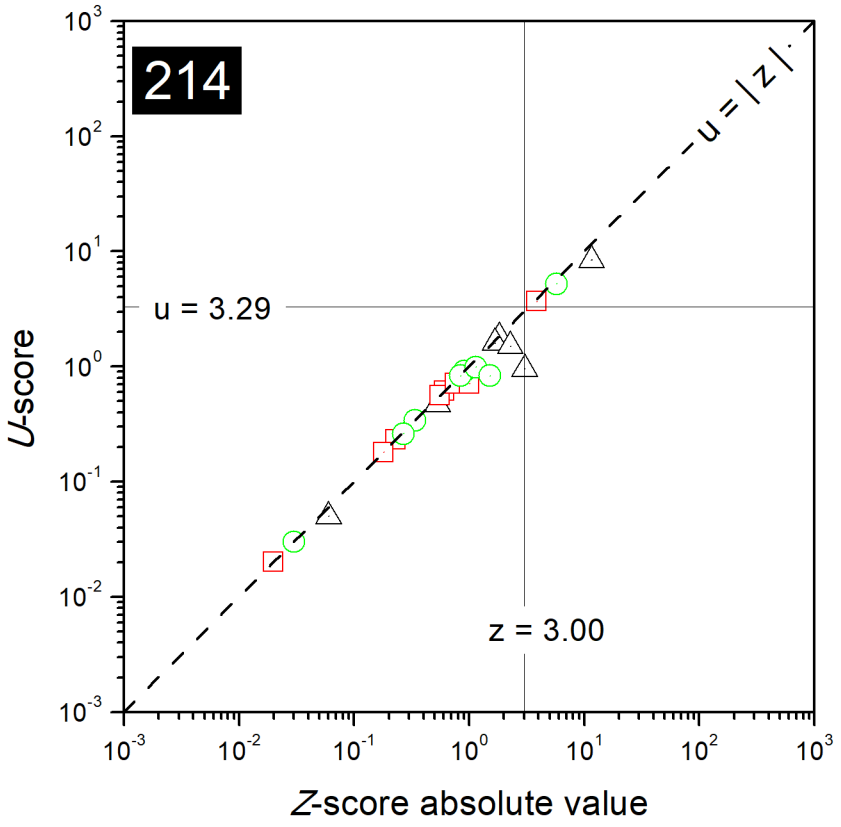

FIG. 76. Combined plots of z- and u-scores for the laboratory with code 214 (Land-Plant material).

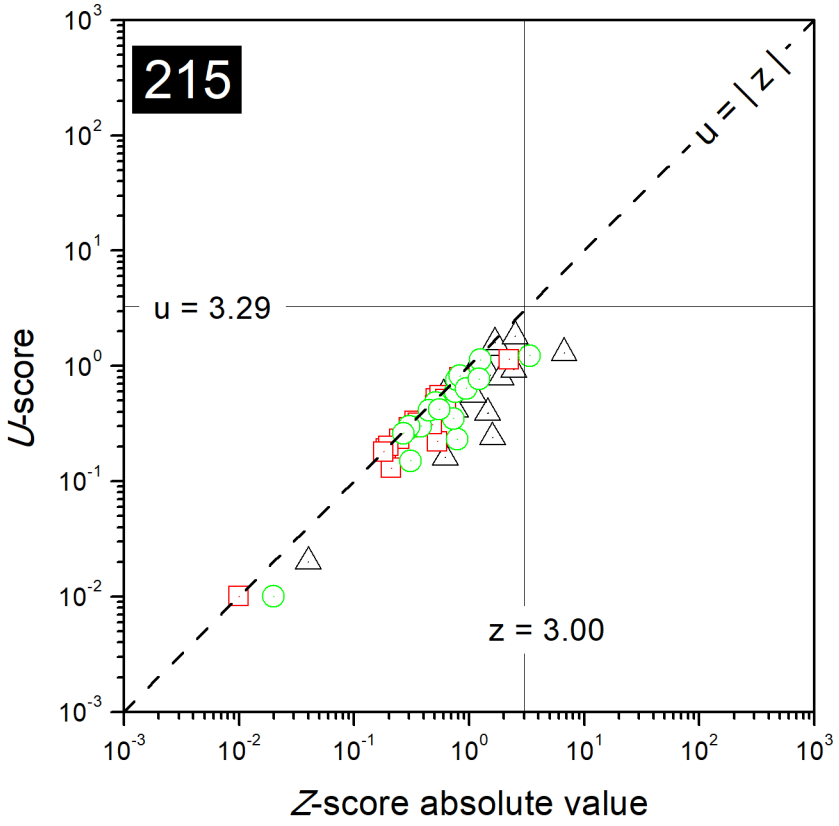

FIG. 77. Combined plots of z- and u-scores for the laboratory with code 215 (Land-Plant material).

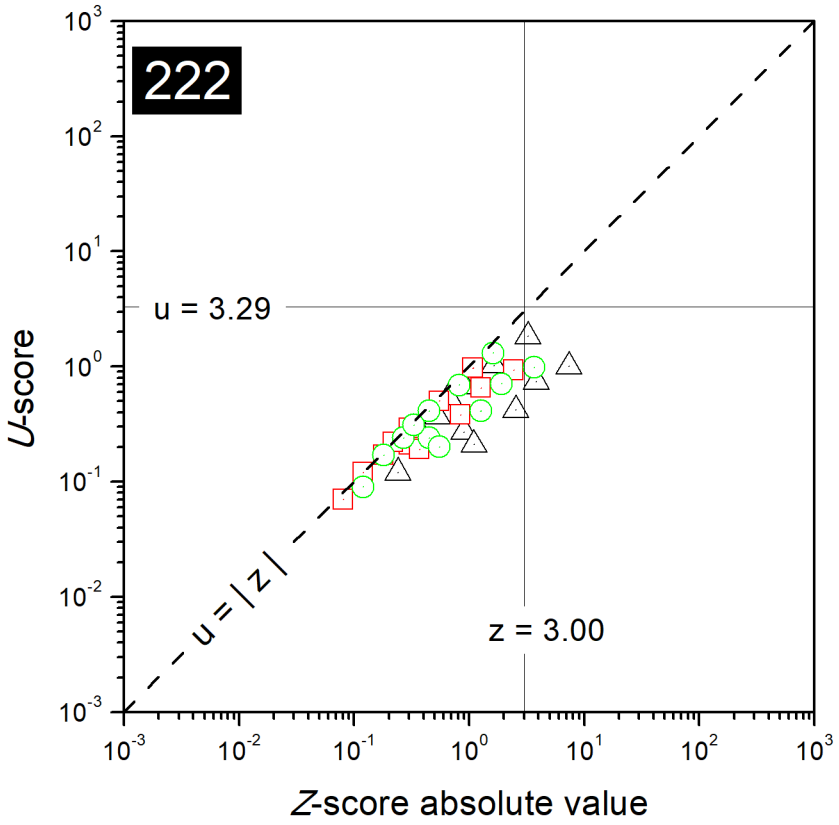

FIG. 78. Combined plots of z- and u-scores for the laboratory with code 222 (Land-Plant material).

- Combined plots of z- and u-scores (Land-plant material) -

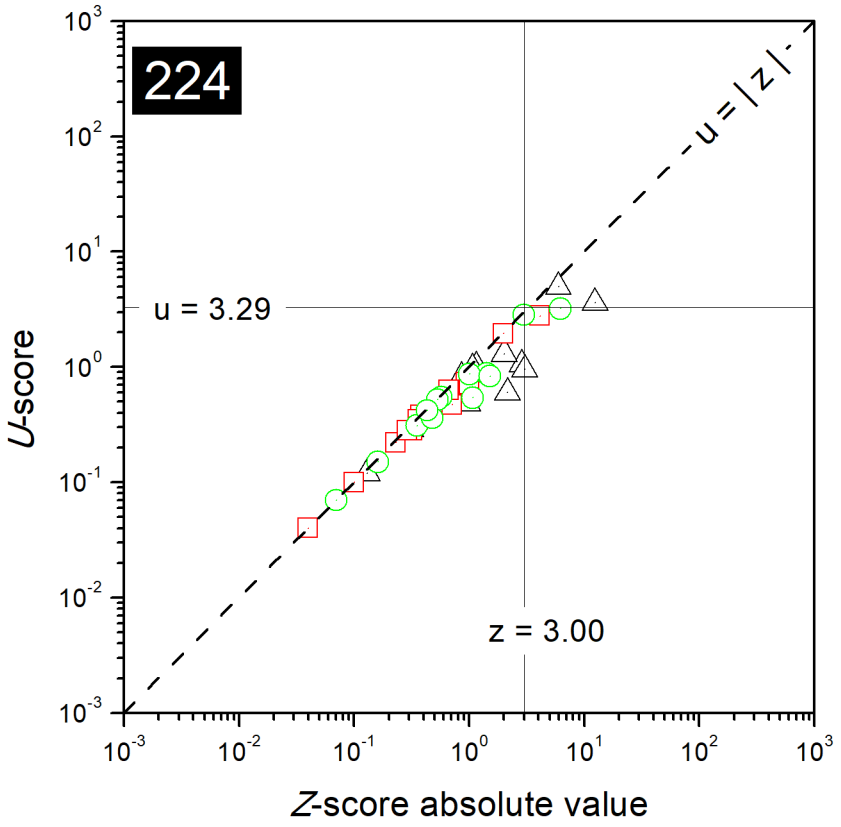

FIG. 79. Combined plots of z- and u-scores for the laboratory with code 224 (Land-Plant material).

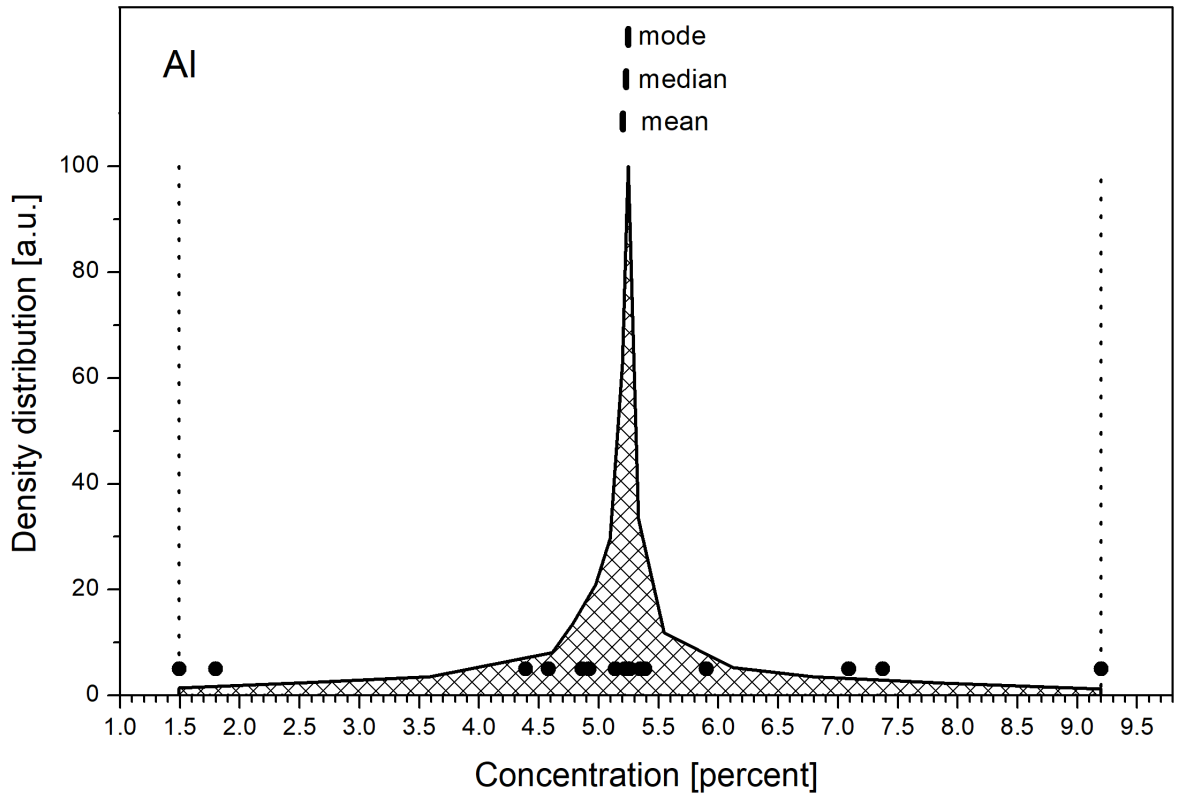

FIG. 80. The density distribution function for the analyte Al (Siliceous material).

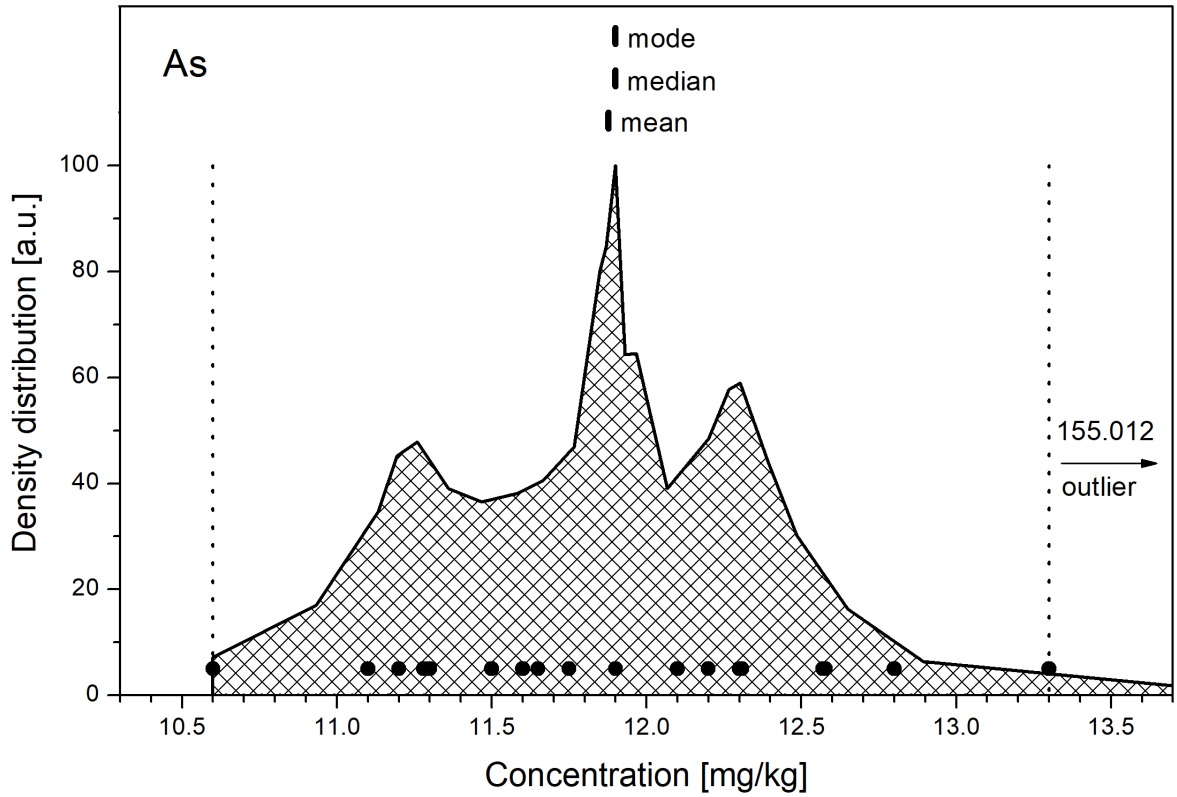

FIG. 81. The density distribution function for the analyte As (Siliceous material).

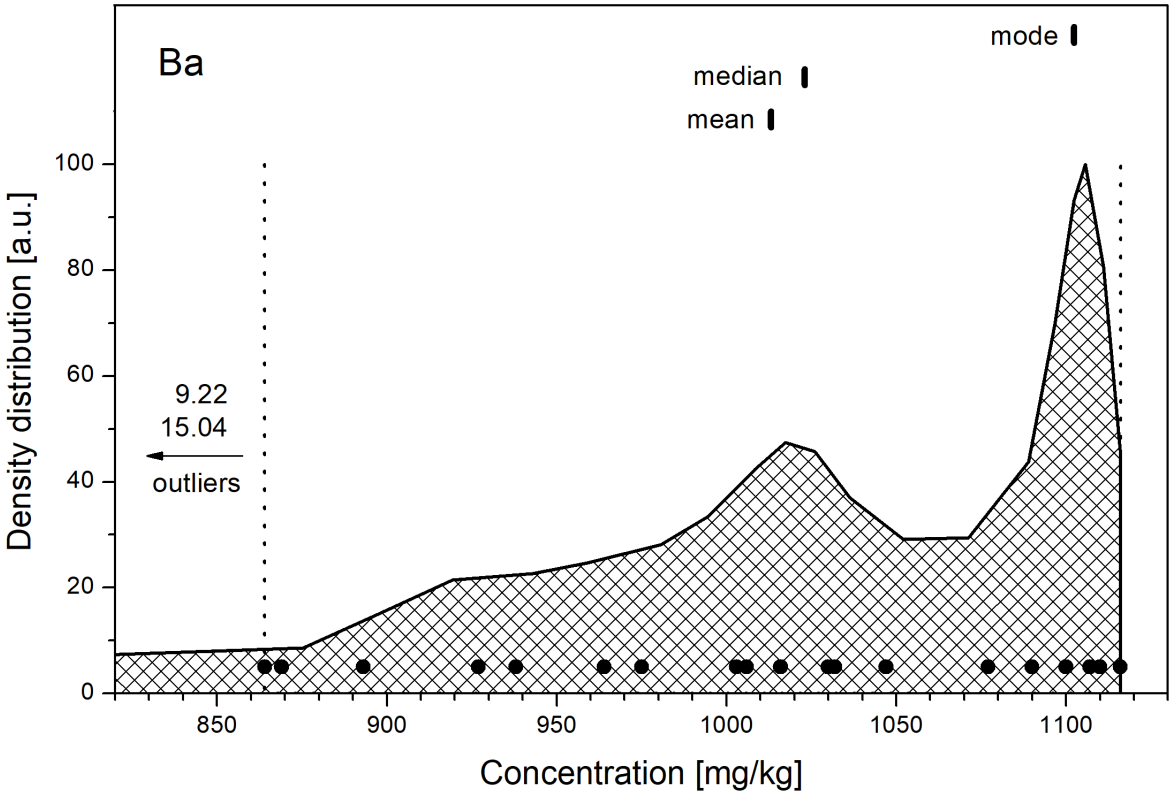

FIG. 82. The density distribution function for the analyte Ba (Siliceous material).

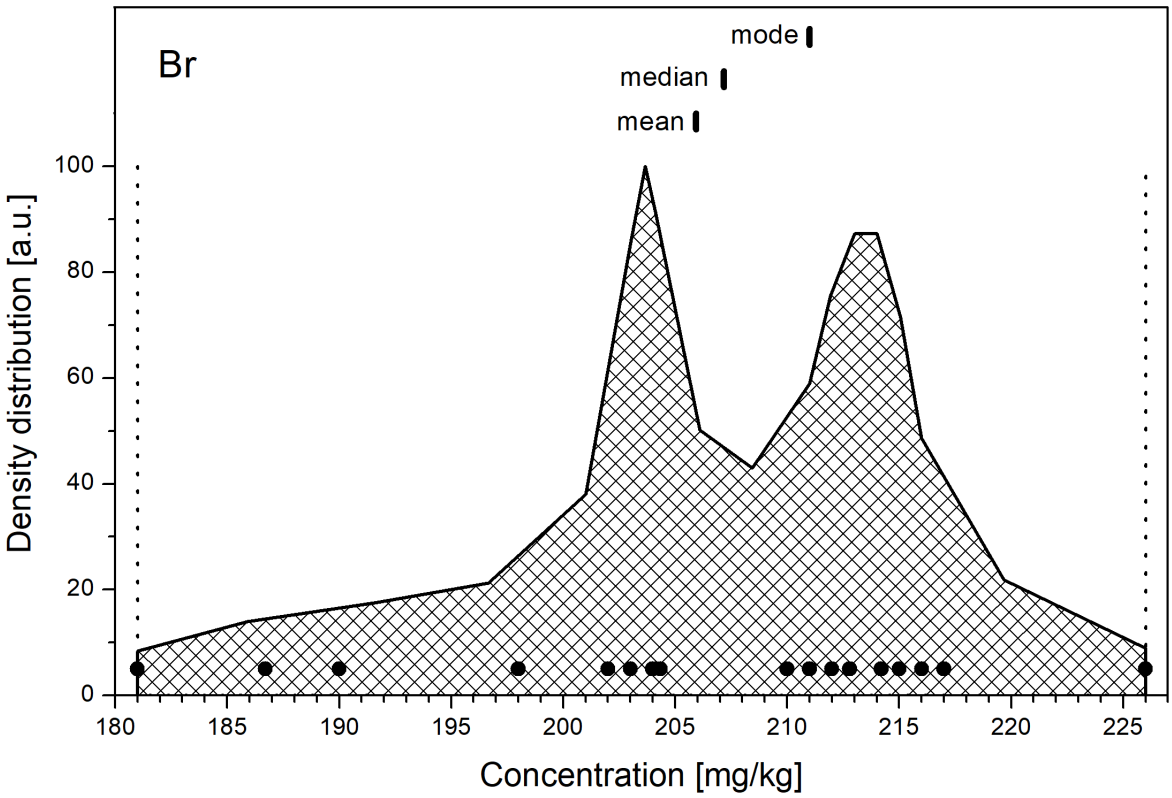

FIG. 83. The density distribution function for the analyte Br (Siliceous material).

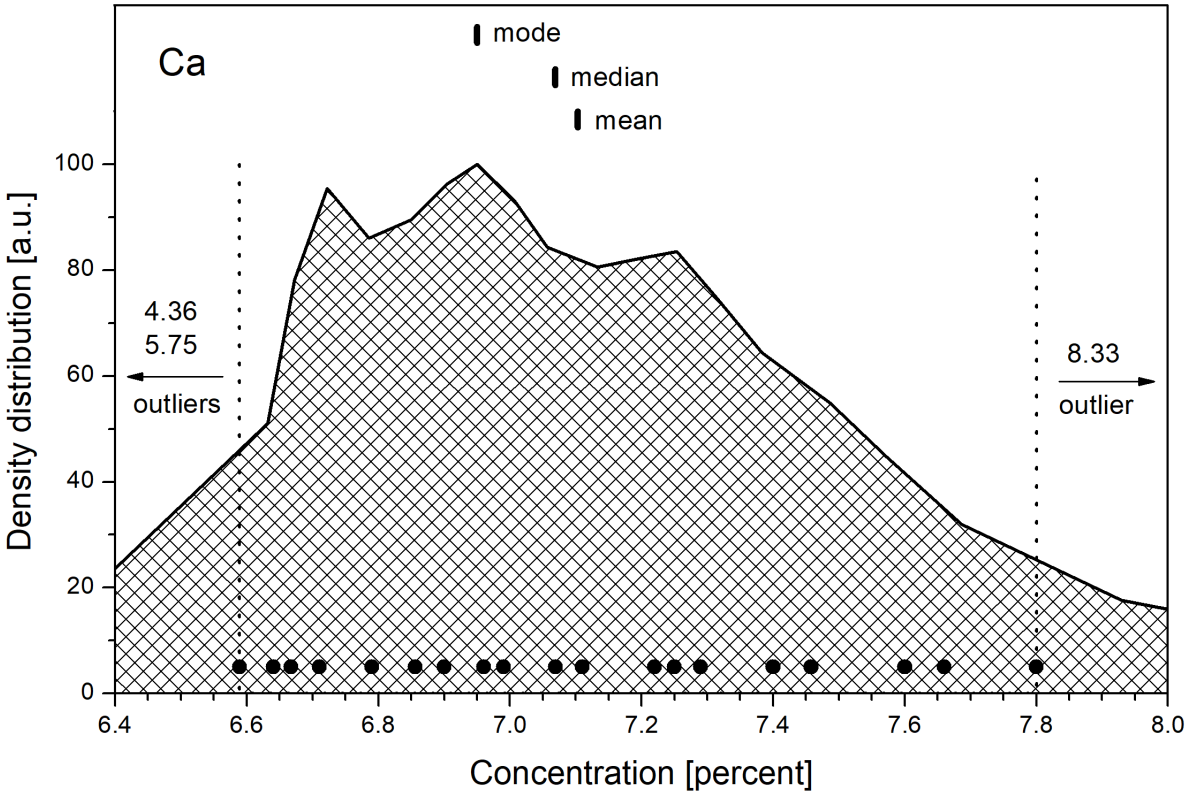

FIG. 84. The density distribution function for the analyte Ca (Siliceous material).

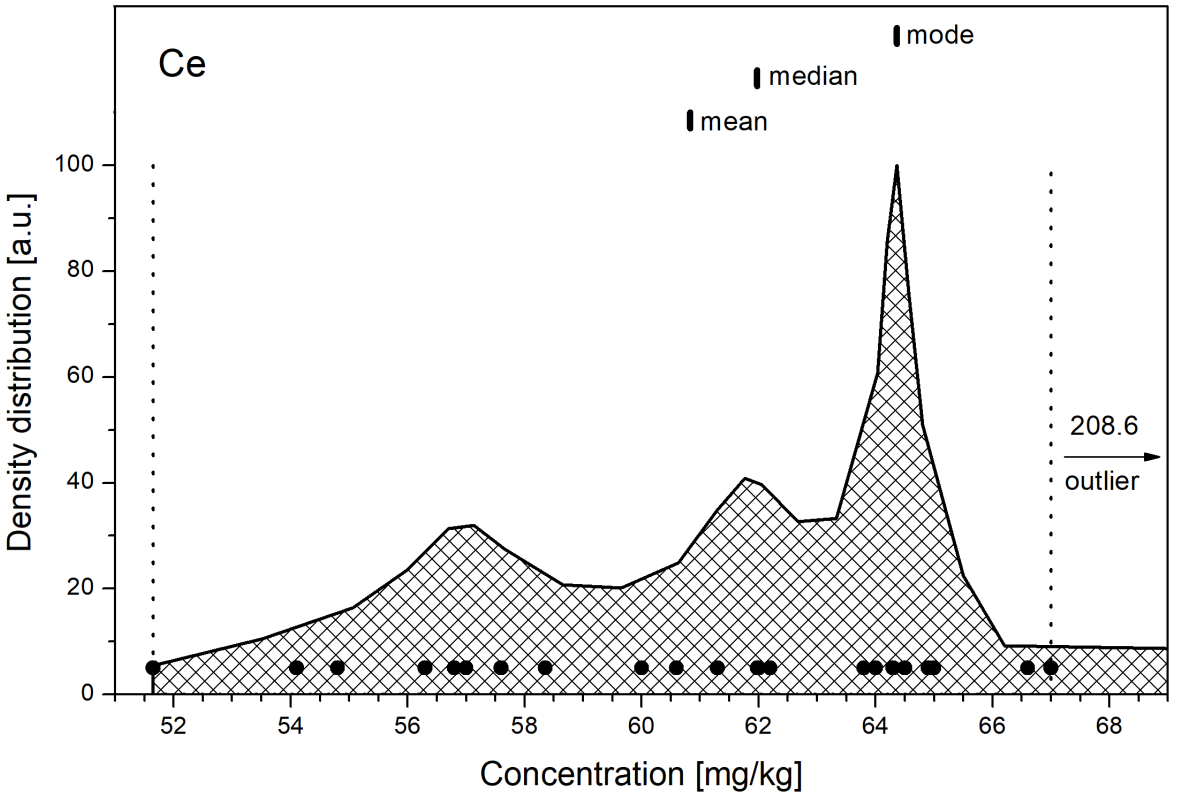

FIG. 85. The density distribution function for the analyte Ce (Siliceous material).

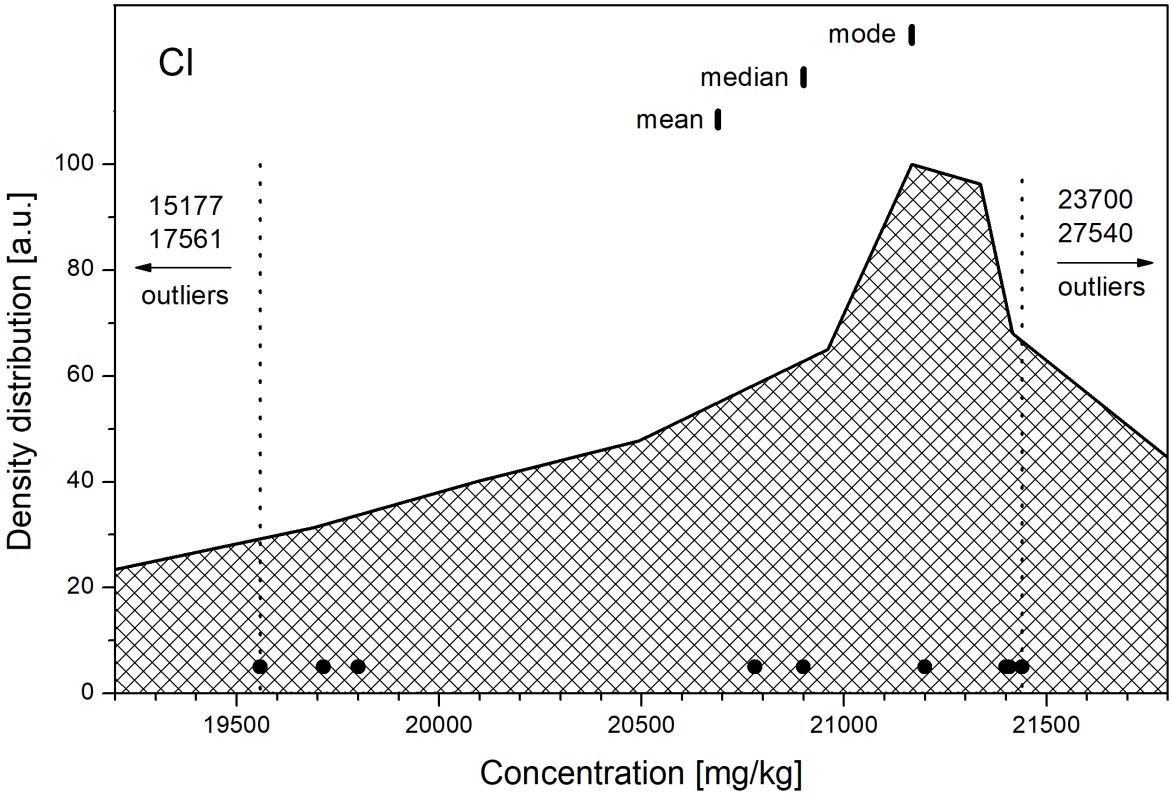

FIG. 86. The density distribution function for the analyte Cl (Siliceous material).

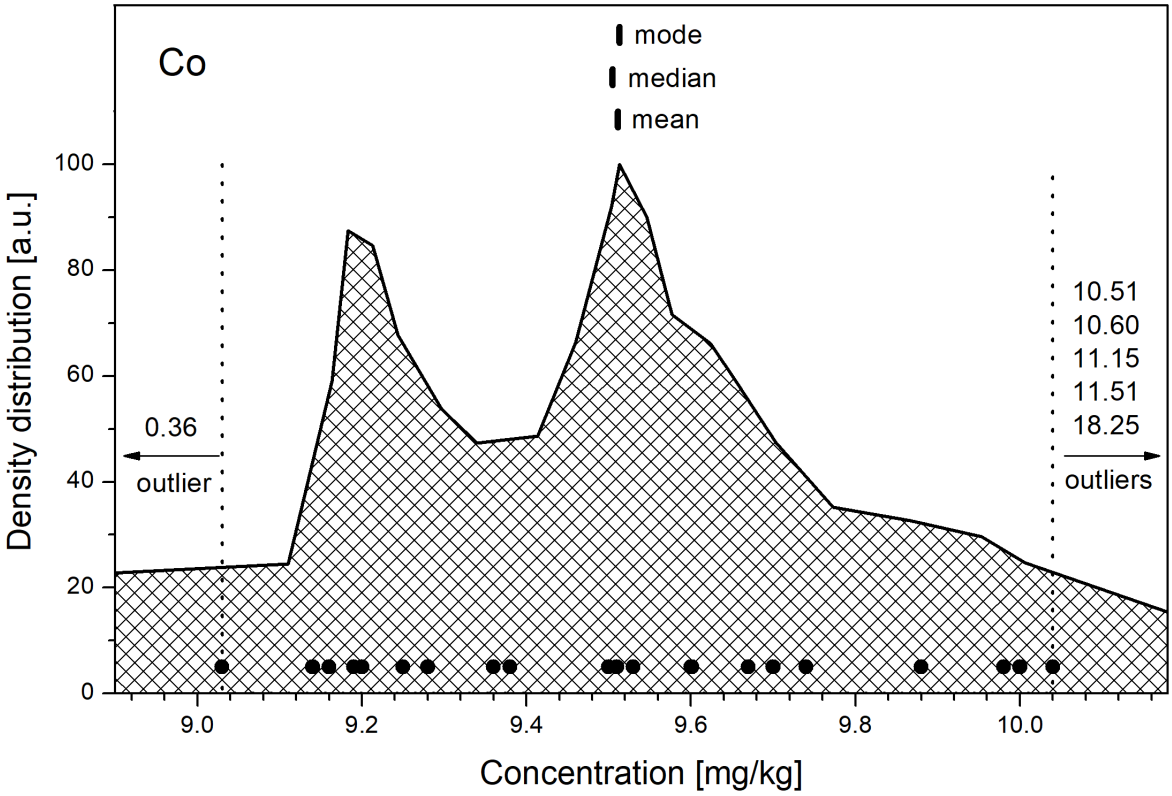

FIG. 87. The density distribution function for the analyte Co (Siliceous material).

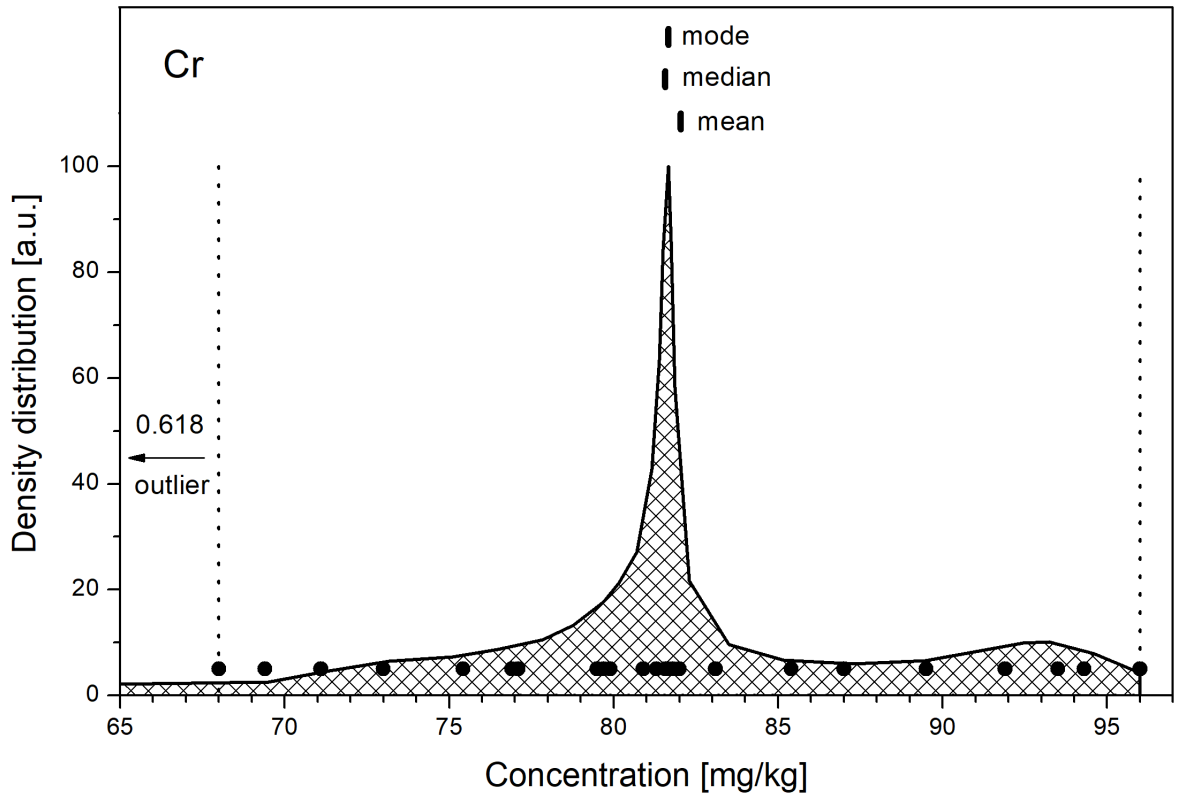

FIG. 88. The density distribution function for the analyte Cr (Siliceous material).

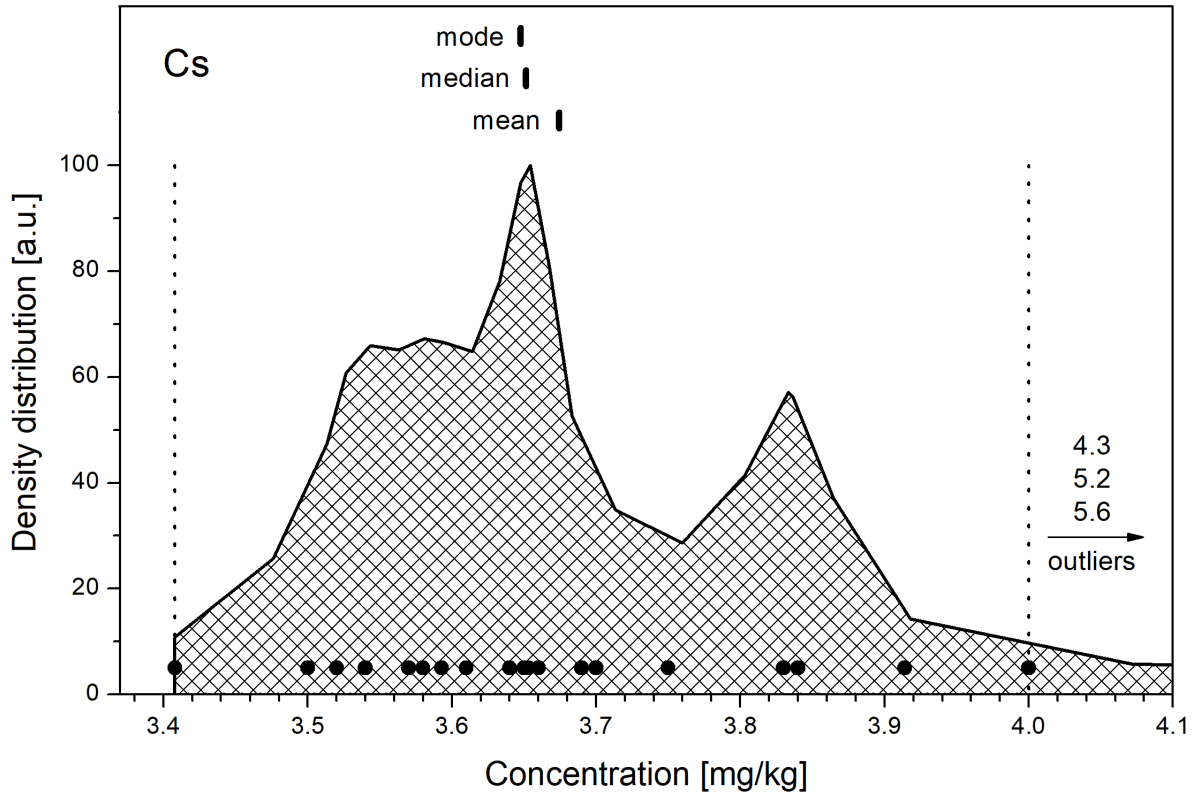

FIG. 89. The density distribution function for the analyte Cs (Siliceous material).

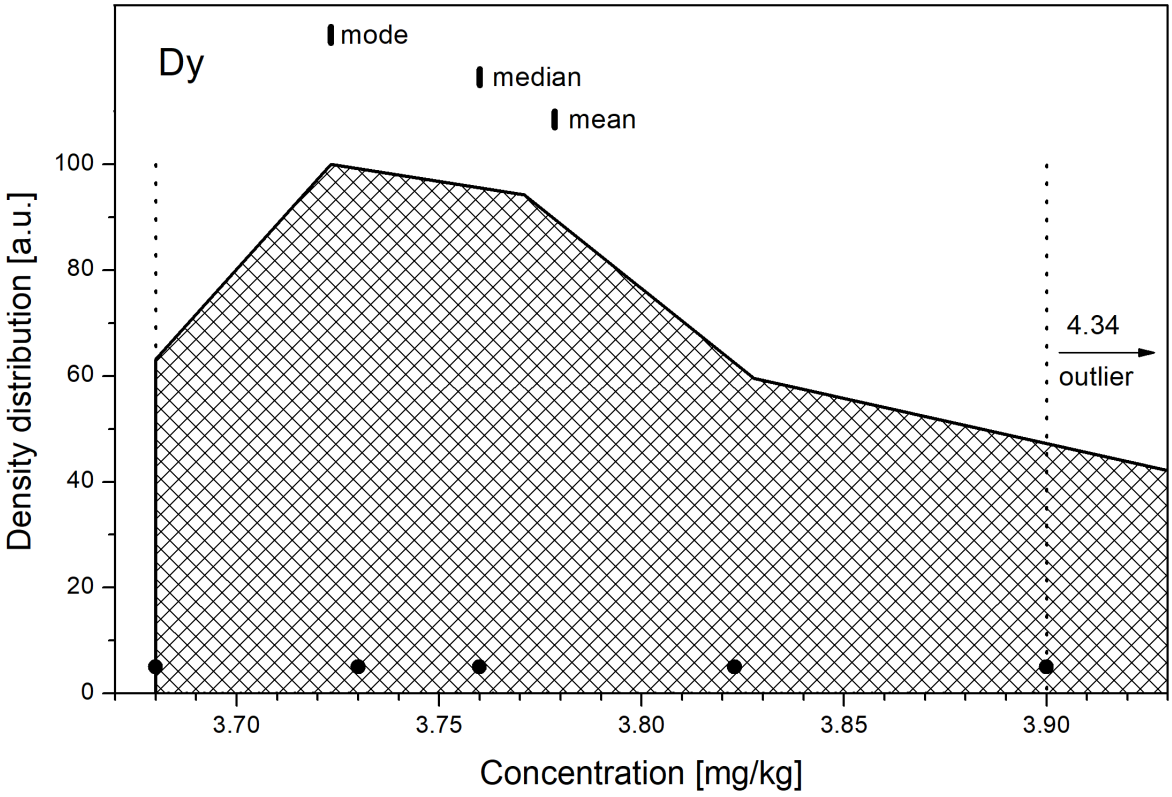

FIG. 90. The density distribution function for the analyte Dy (Siliceous material).

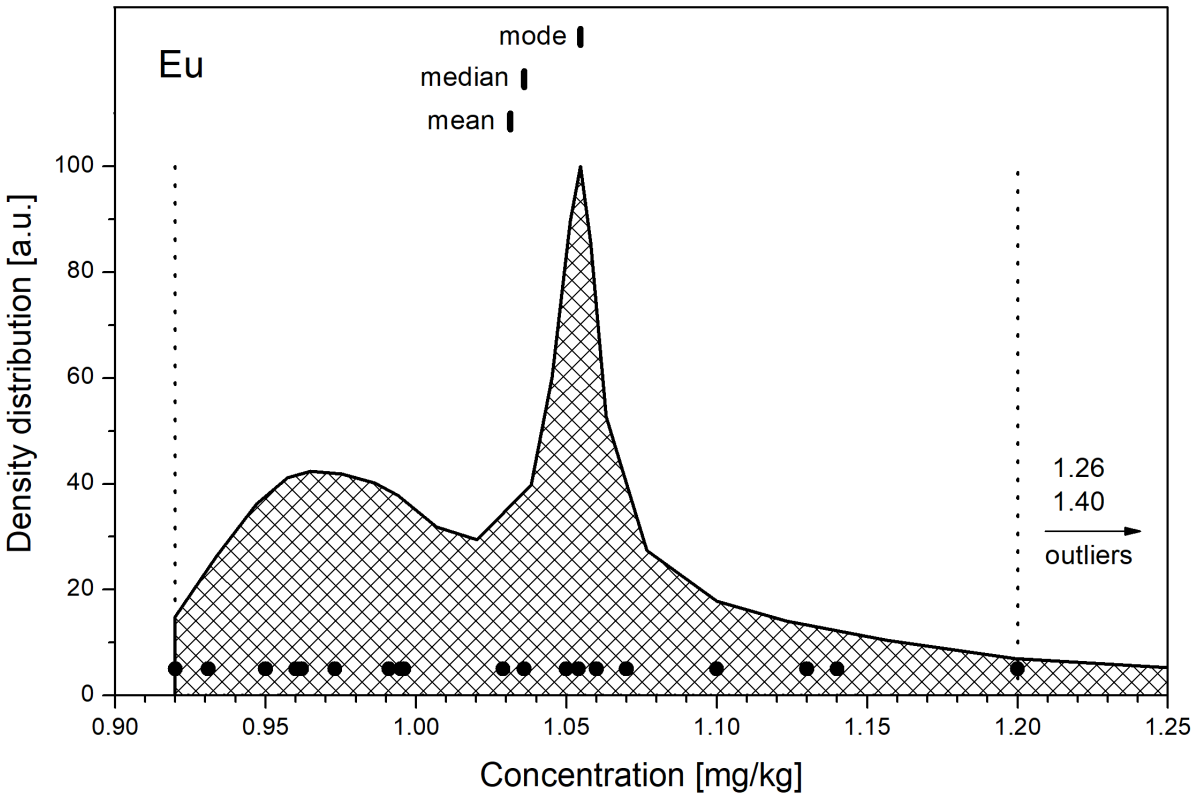

FIG. 91. The density distribution function for the analyte Eu (Siliceous material).

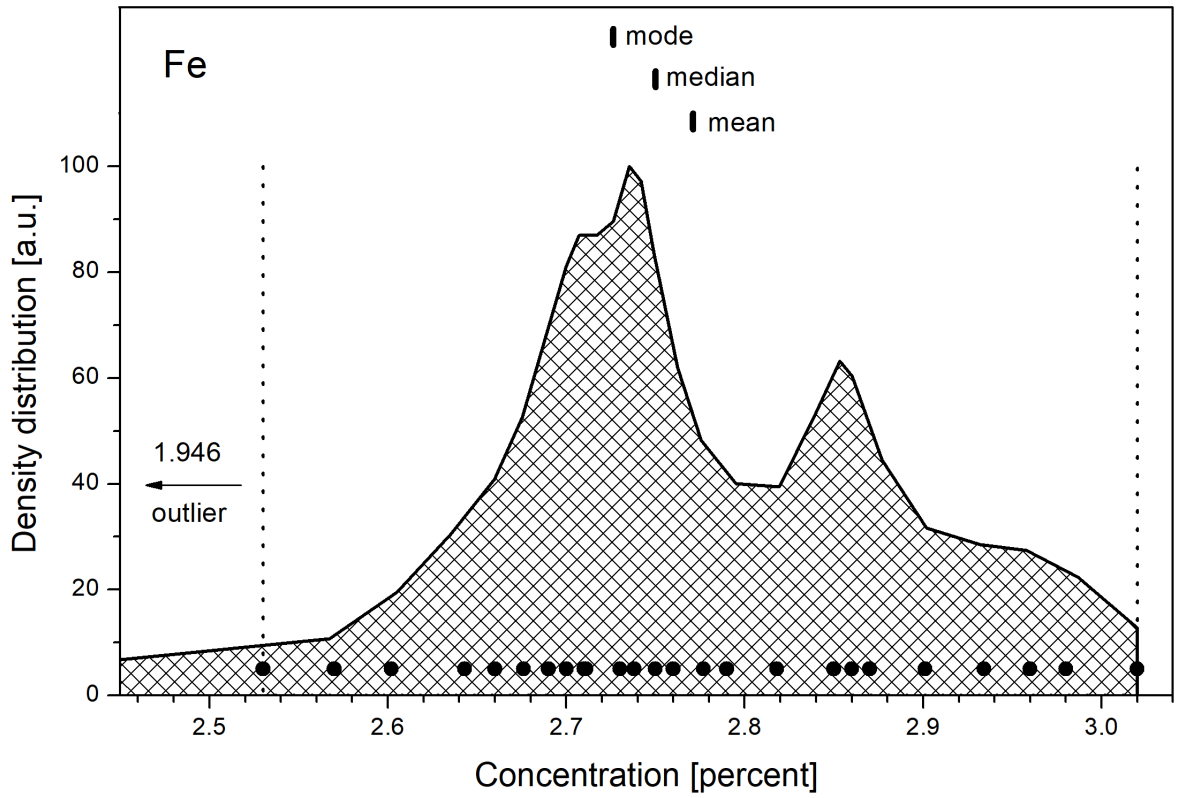

FIG. 92. The density distribution function for the analyte Fe (Siliceous material).

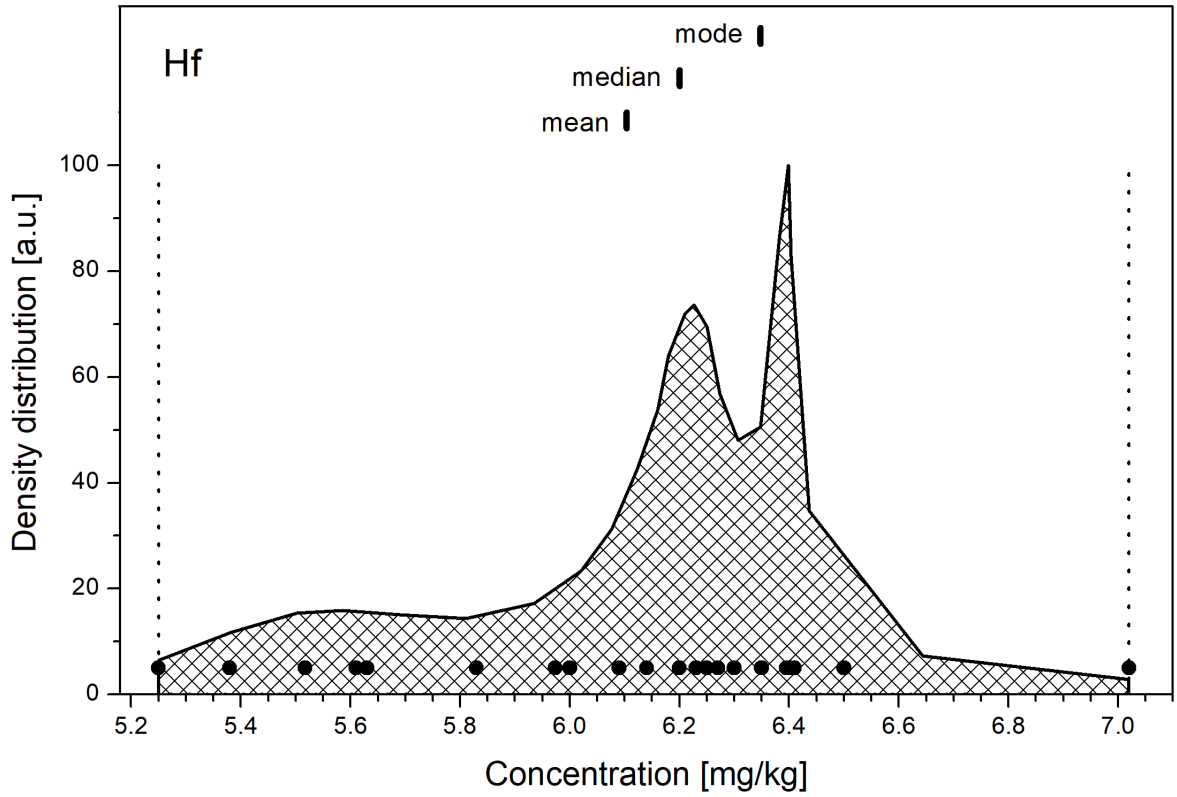

FIG. 93. The density distribution function for the analyte Hf (Siliceous material).

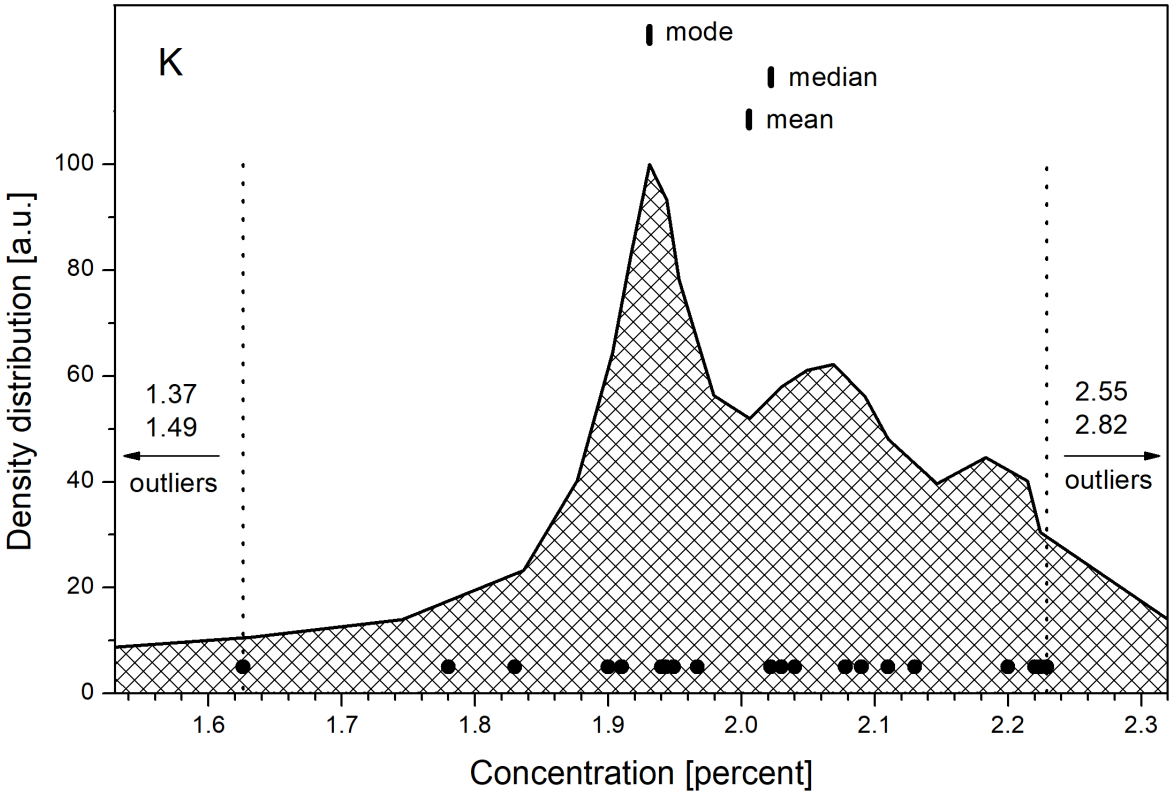

FIG. 94. The density distribution function for the analyte K (Siliceous material).

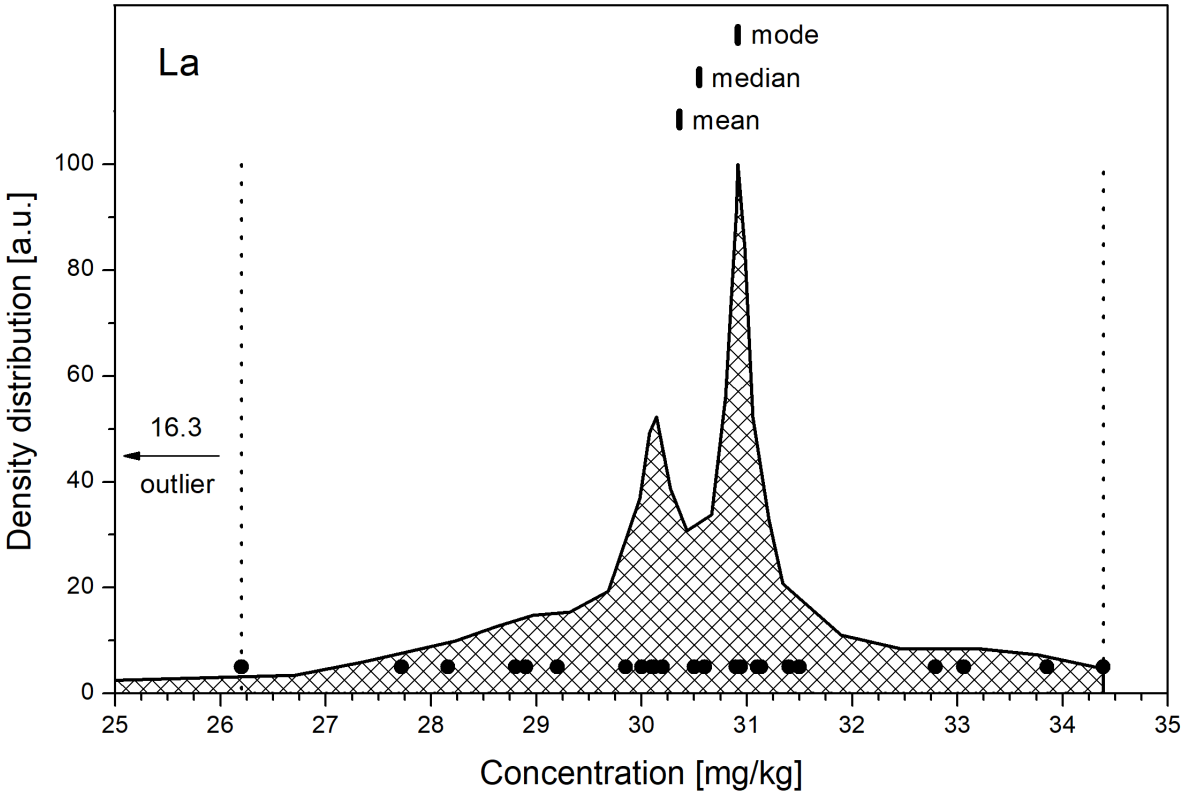

FIG. 95. The density distribution function for the analyte La (Siliceous material).

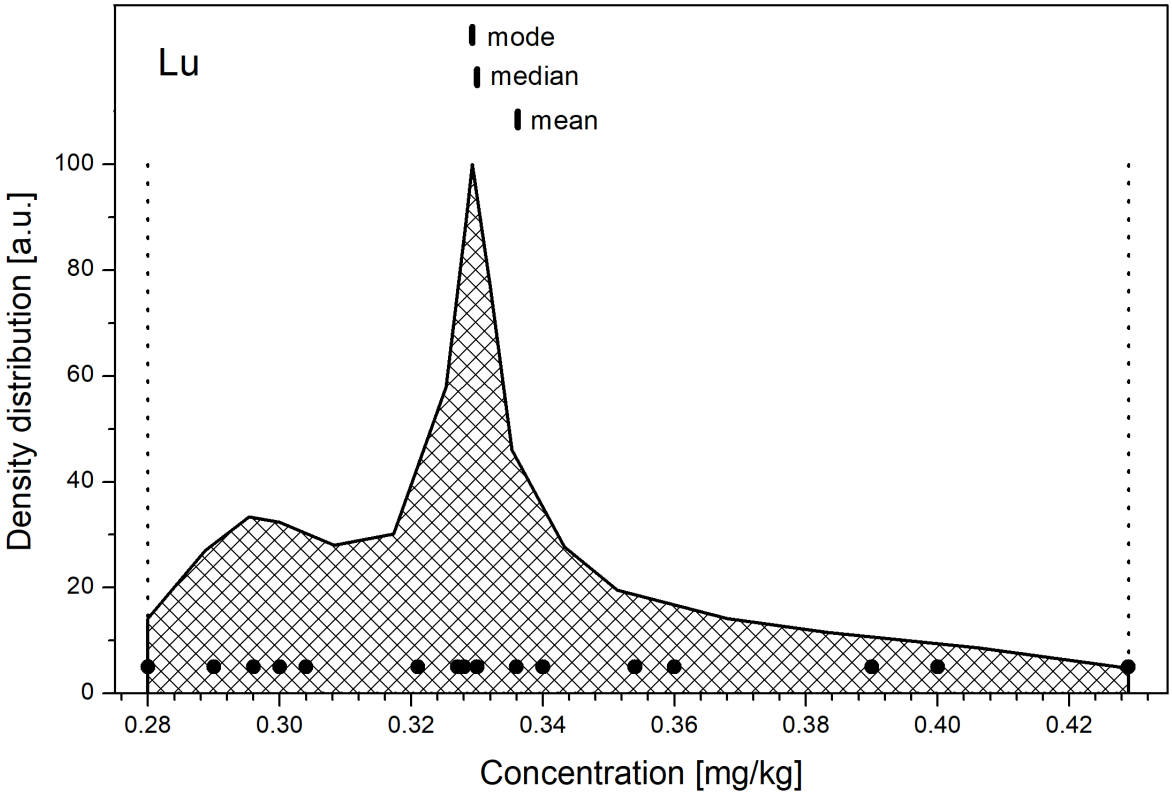

FIG. 96. The density distribution function for the analyte Lu (Siliceous material).

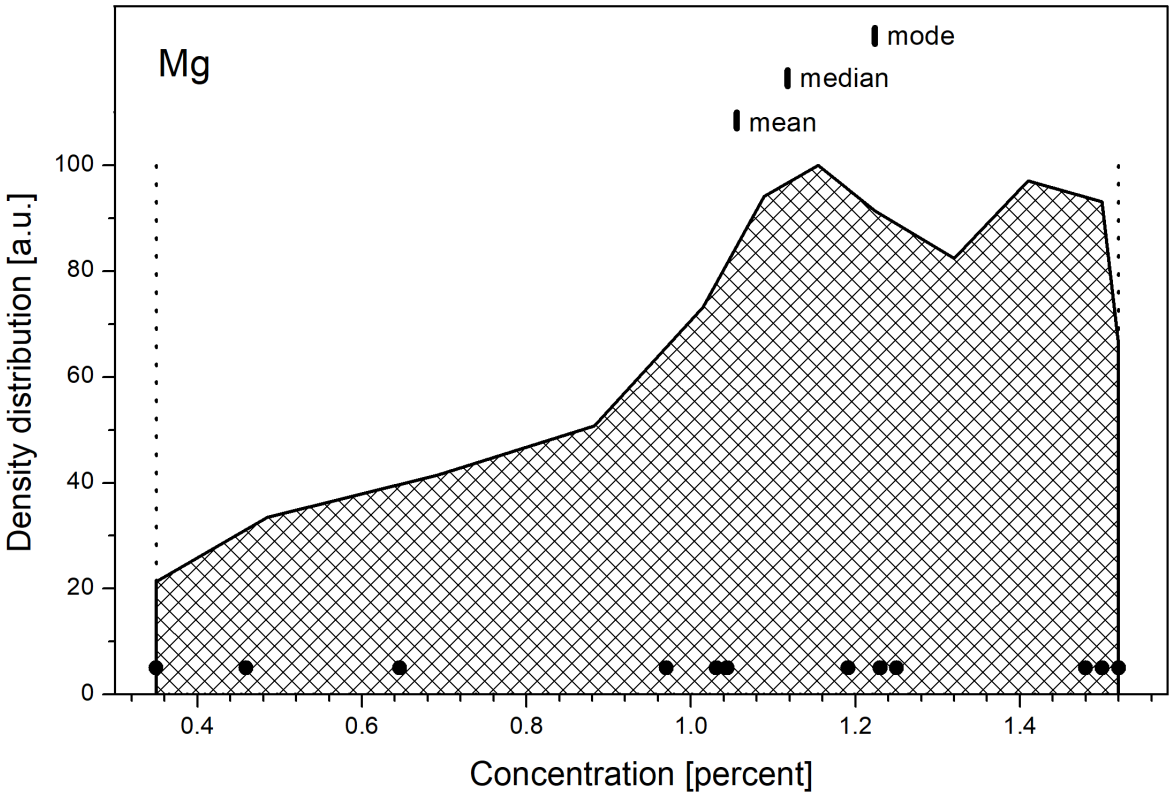

FIG. 97. The density distribution function for the analyte Mg (Siliceous material).

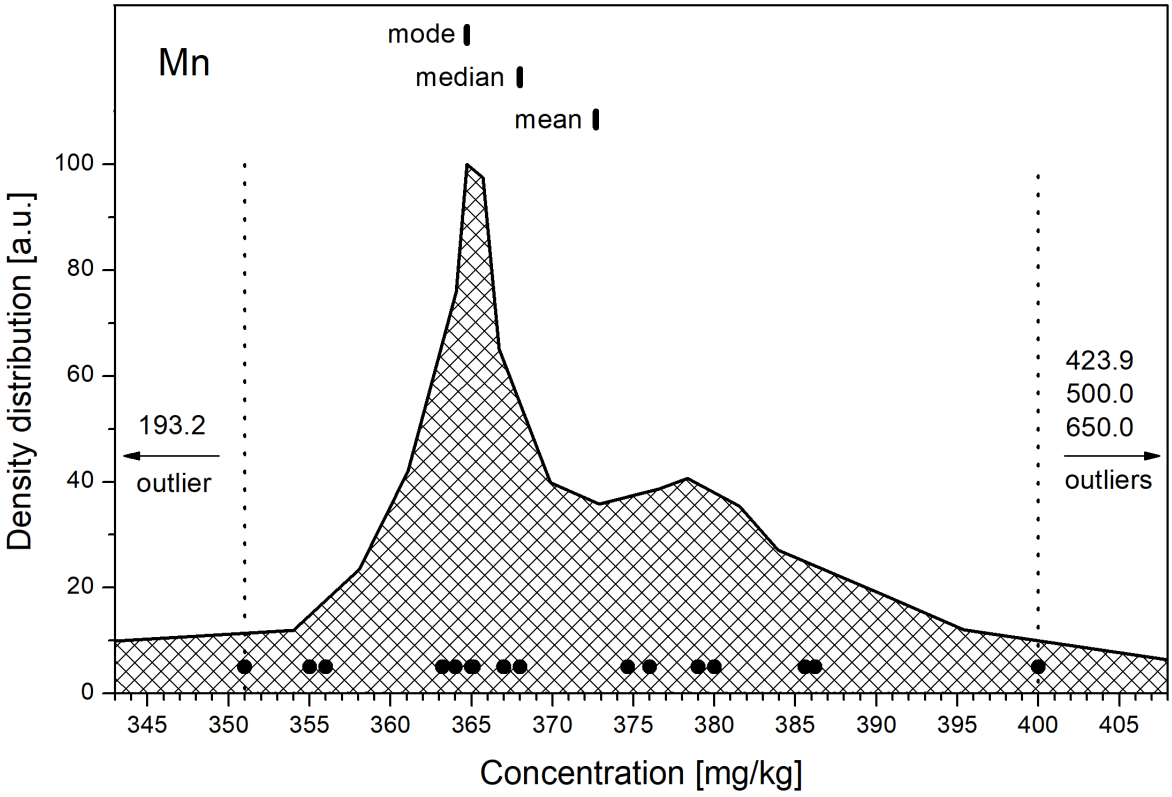

FIG. 98. The density distribution function for the analyte Mn (Siliceous material).

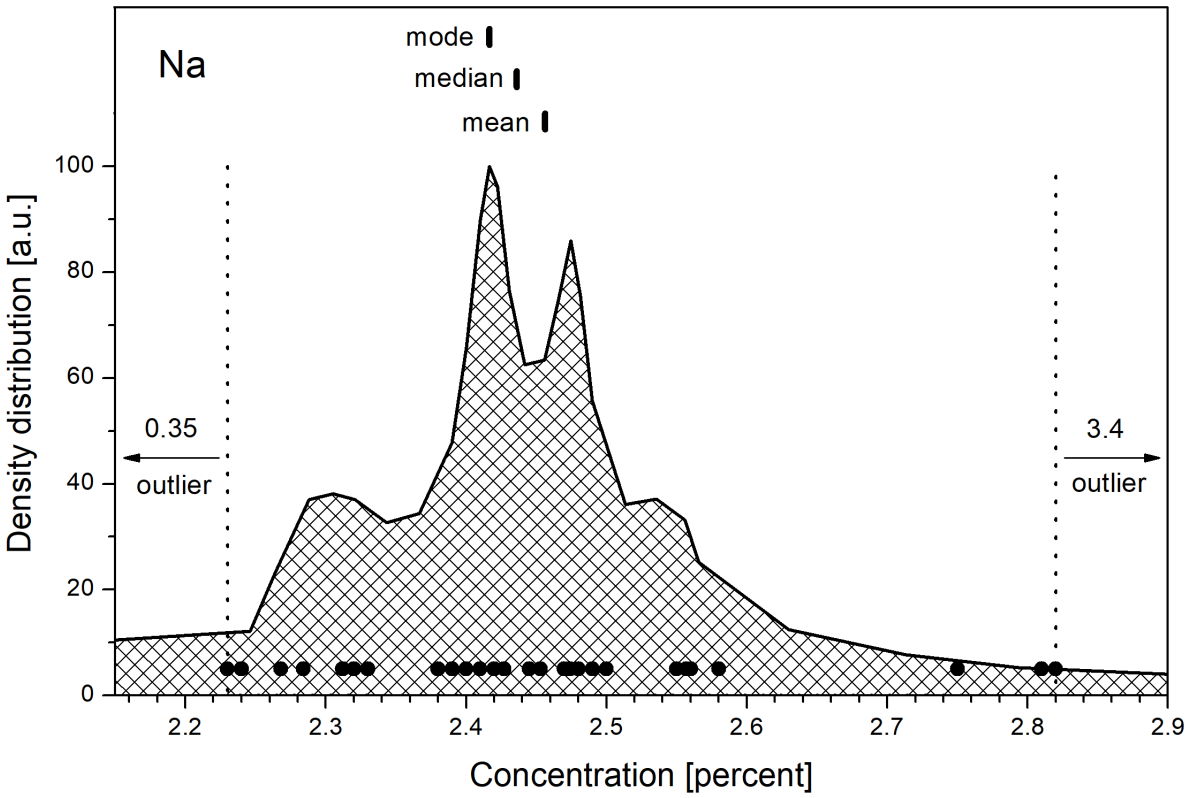

FIG. 99. The density distribution function for the analyte Na (Siliceous material).

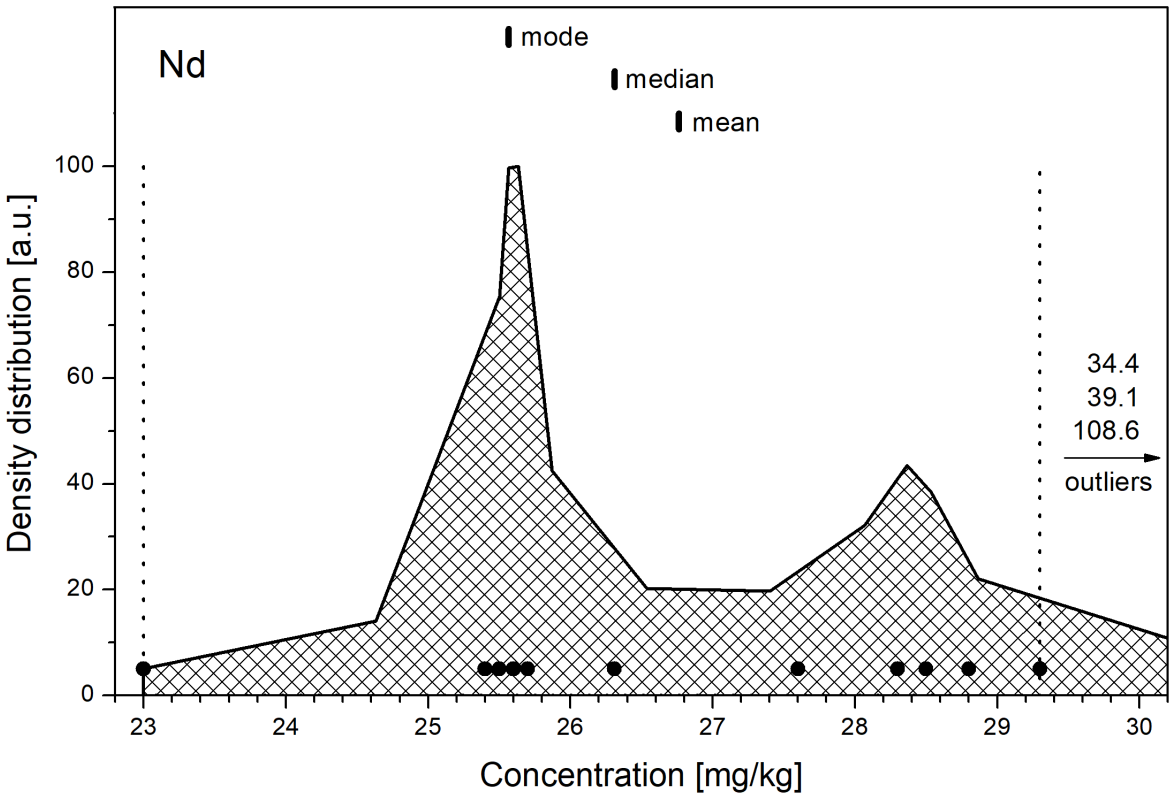

FIG. 100. The density distribution function for the analyte Nd (Siliceous material).

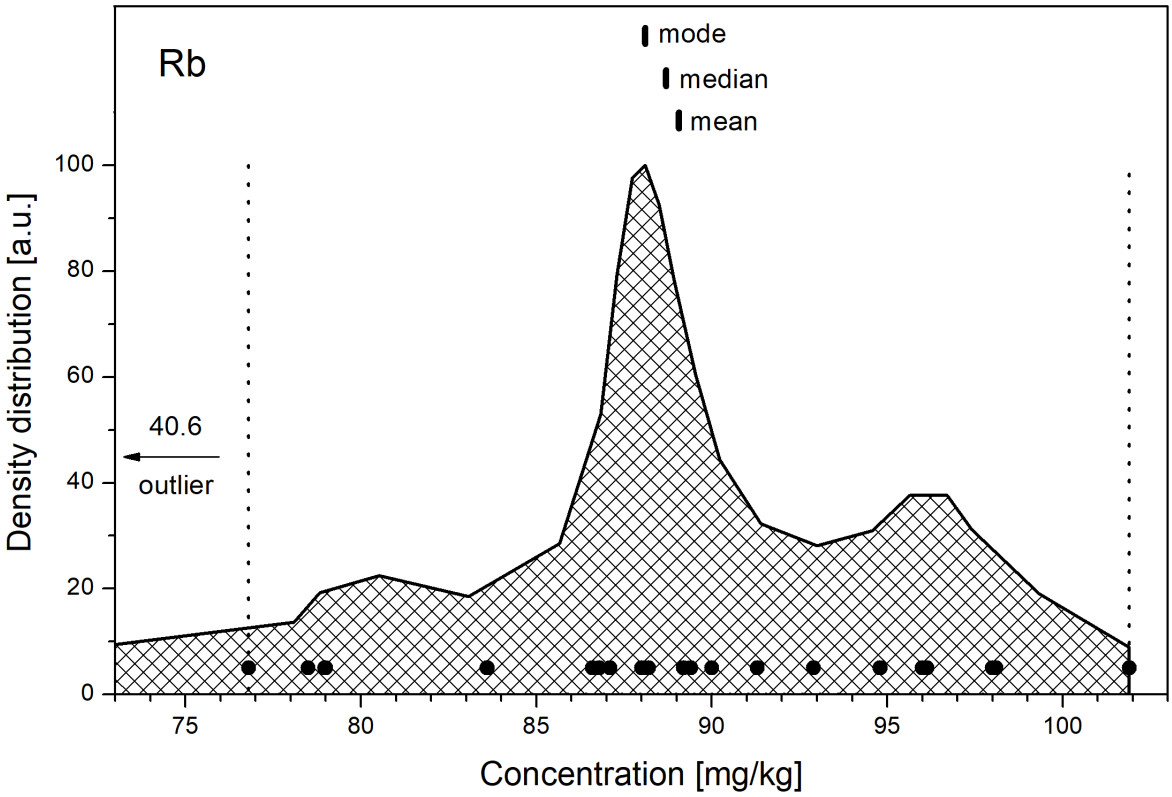

FIG. 101. The density distribution function for the analyte Rb (Siliceous material).

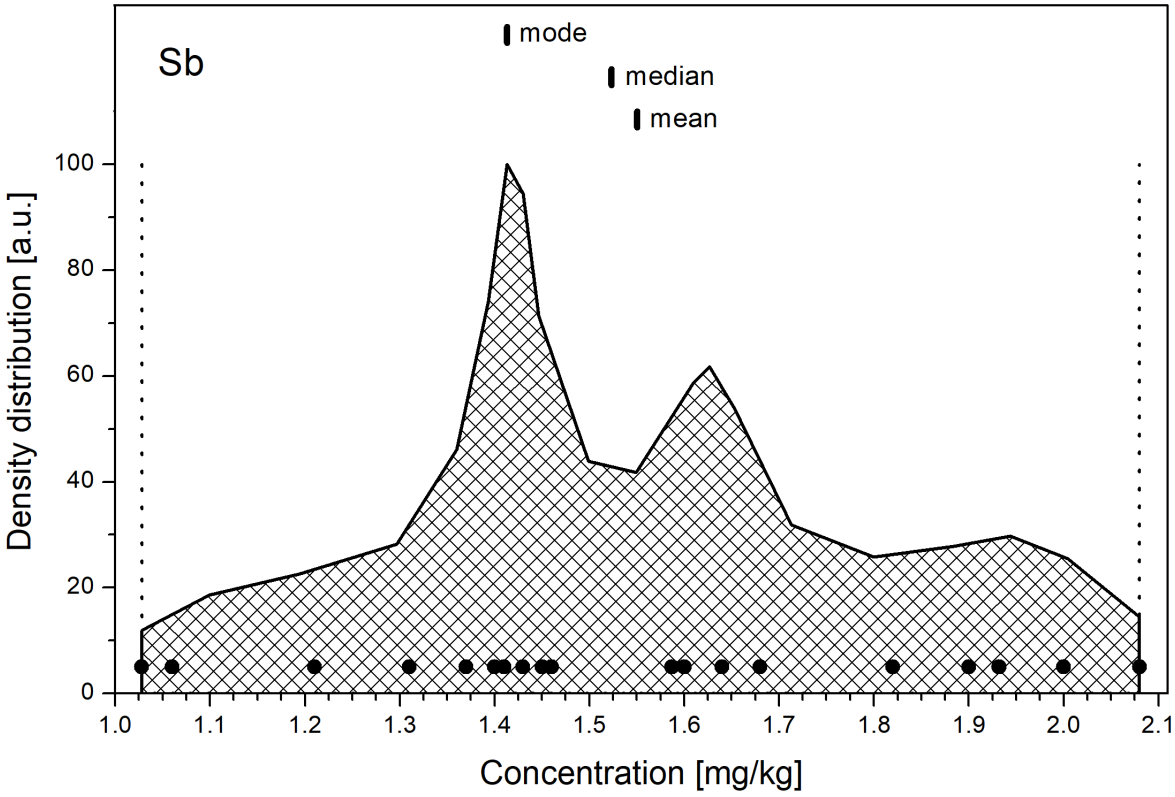

FIG. 102. The density distribution function for the analyte Sb (Siliceous material).

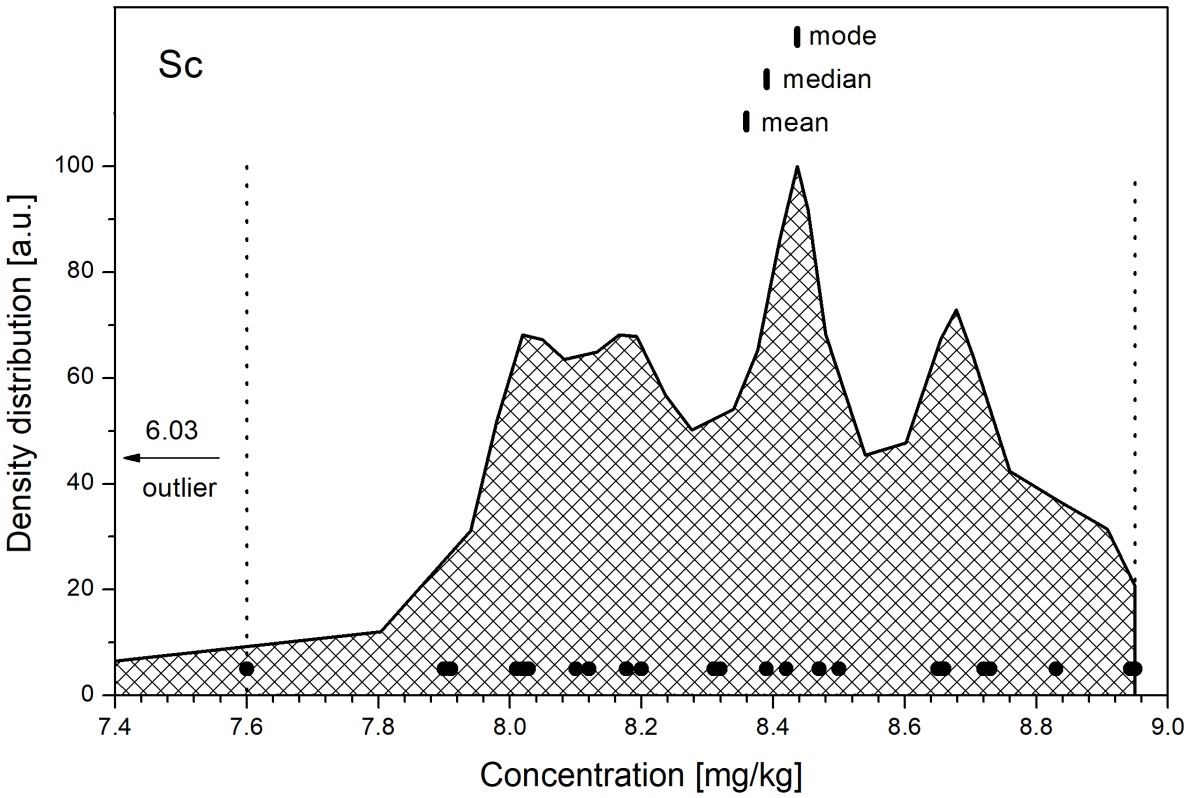

FIG. 103. The density distribution function for the analyte Sc (Siliceous material).

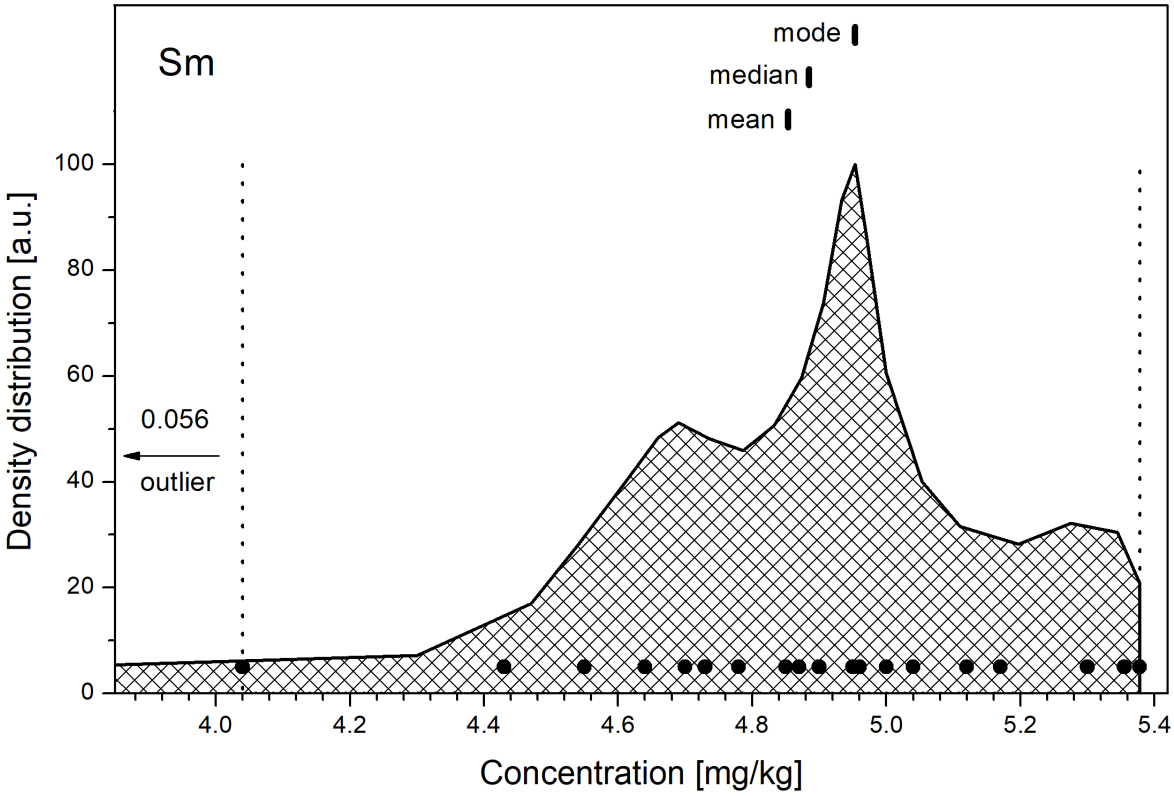

FIG. 104. The density distribution function for the analyte Sm (Siliceous material).

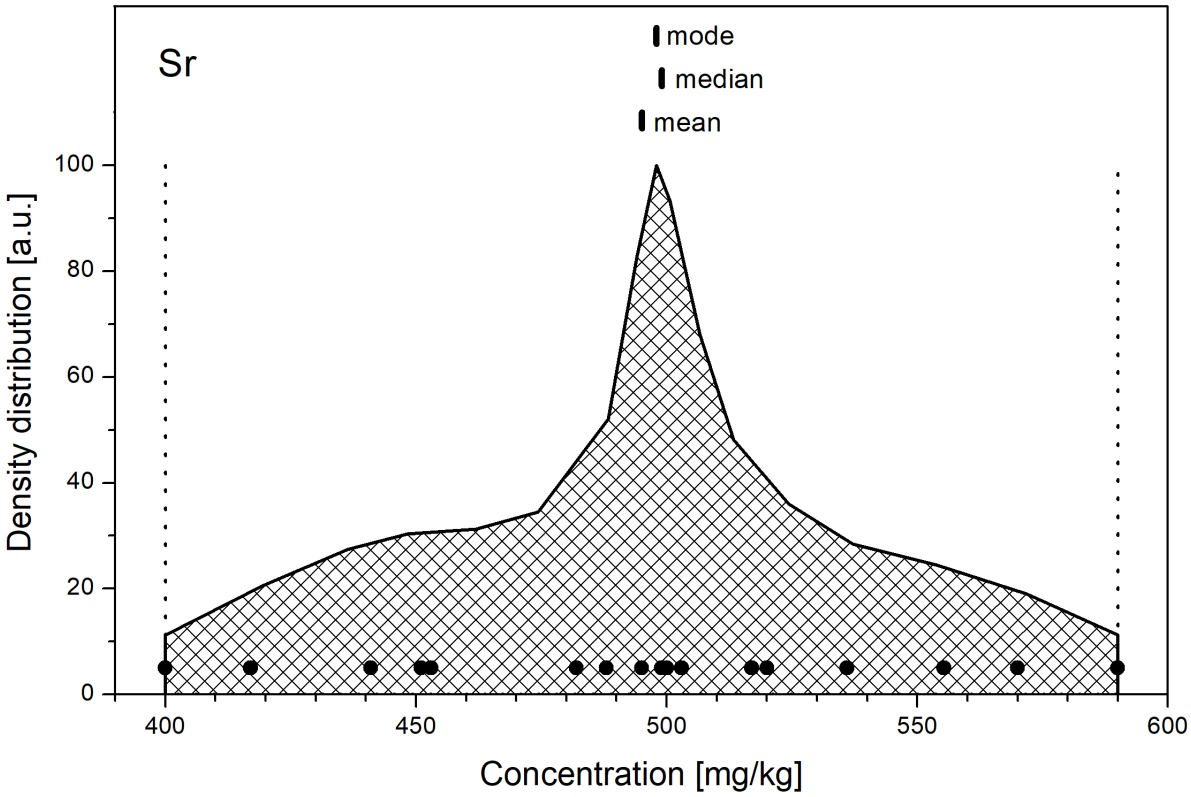

FIG. 105. The density distribution function for the analyte Sr (Siliceous material).

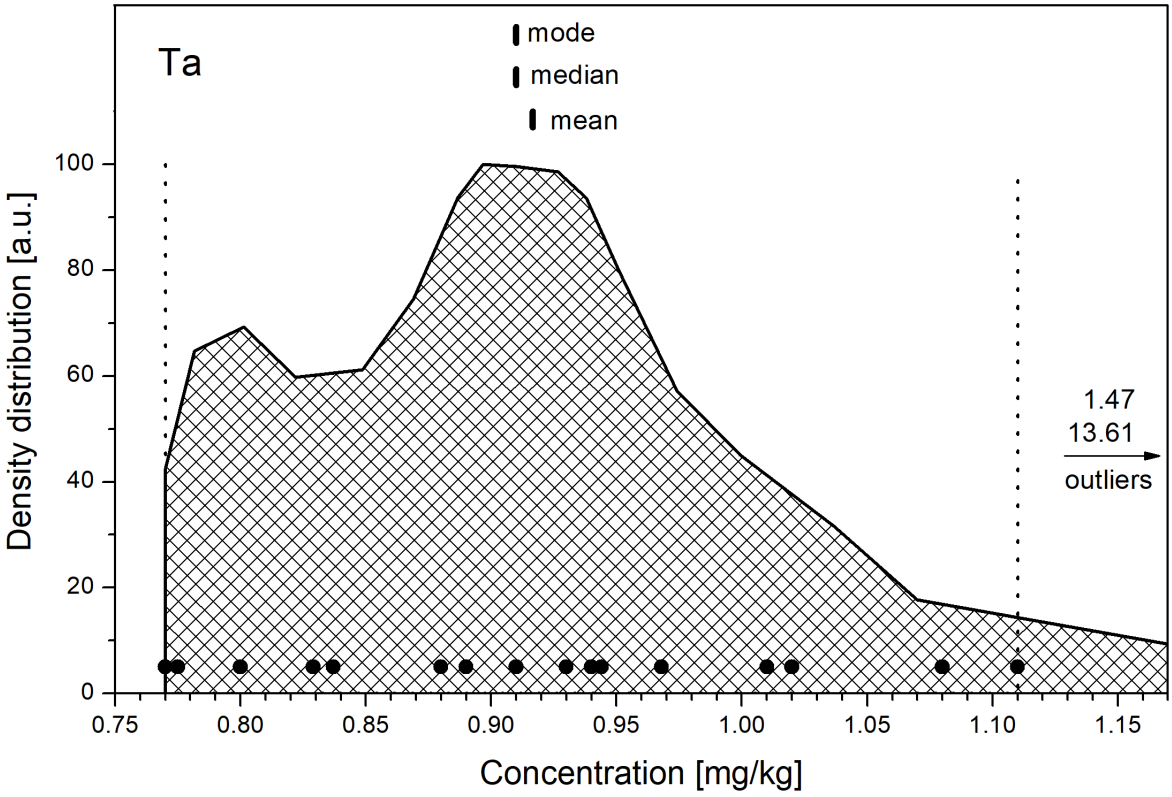

FIG. 106. The density distribution function for the analyte Ta (Siliceous material).

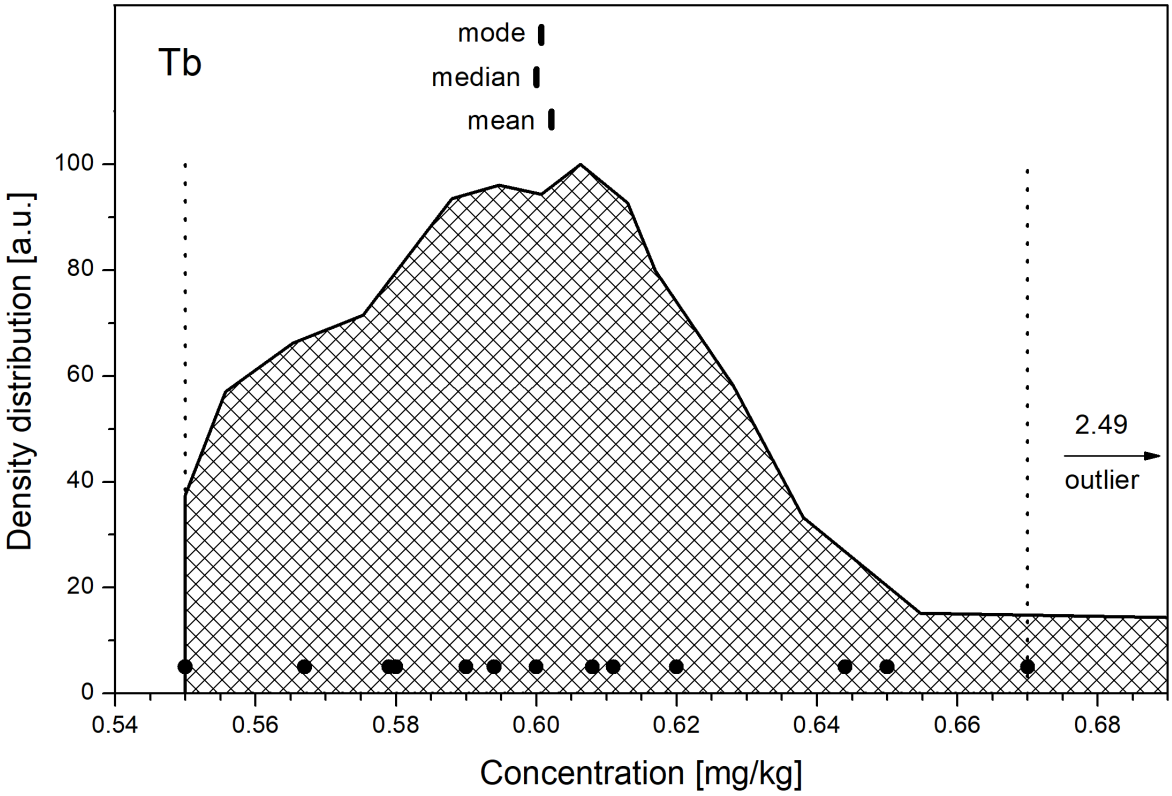

FIG. 107. The density distribution function for the analyte Tb (Siliceous material).

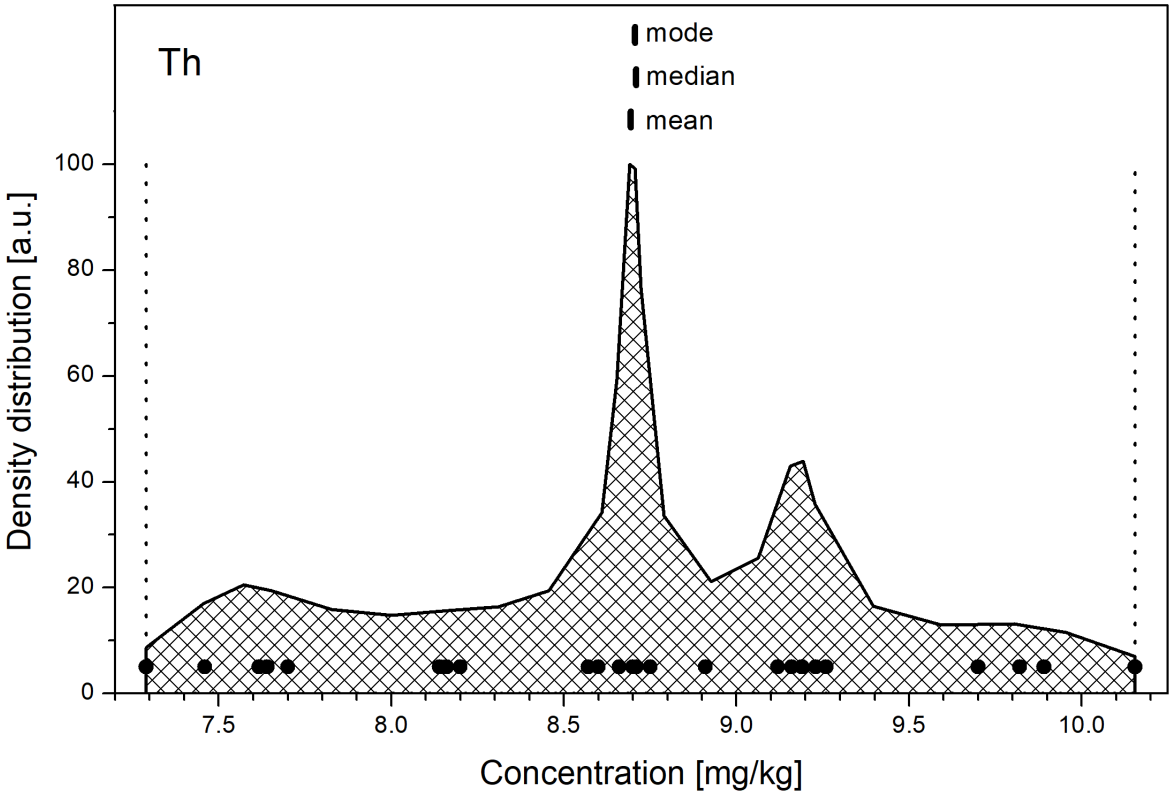

FIG. 108. The density distribution function for the analyte Th (Siliceous material).

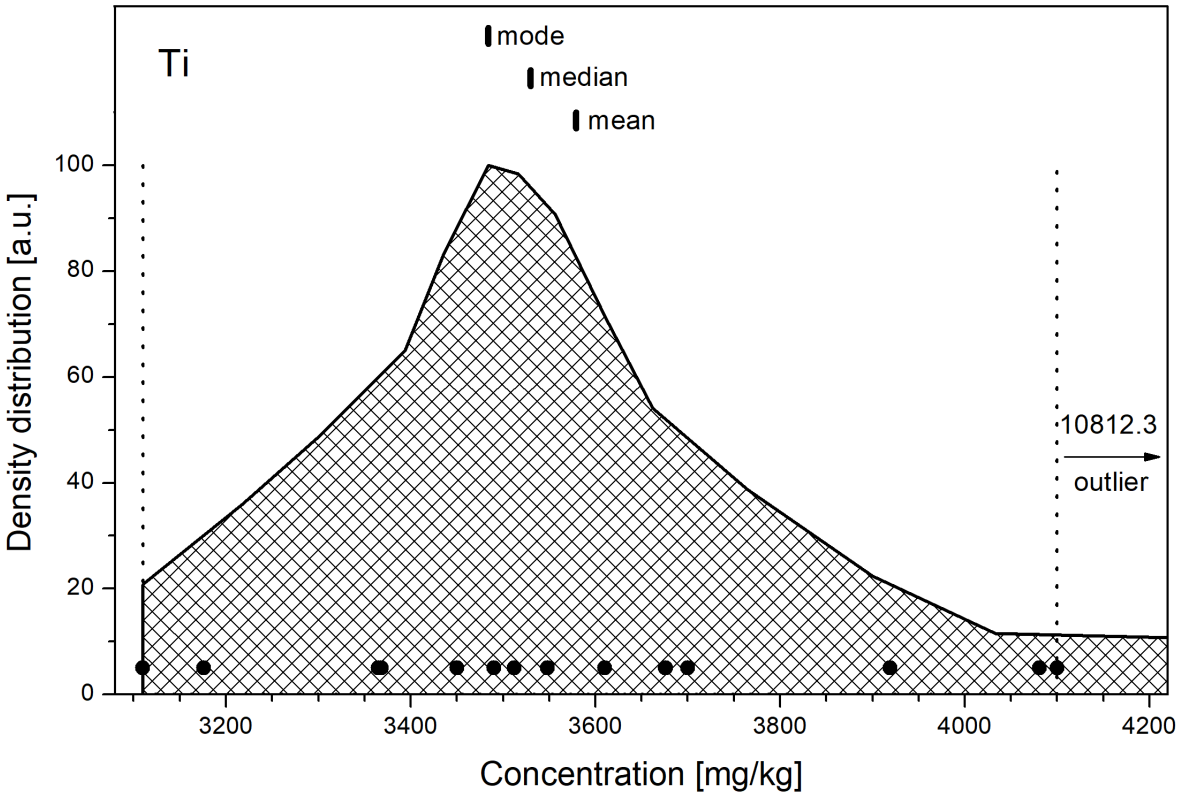

FIG. 109. The density distribution function for the analyte Ti (Siliceous material).

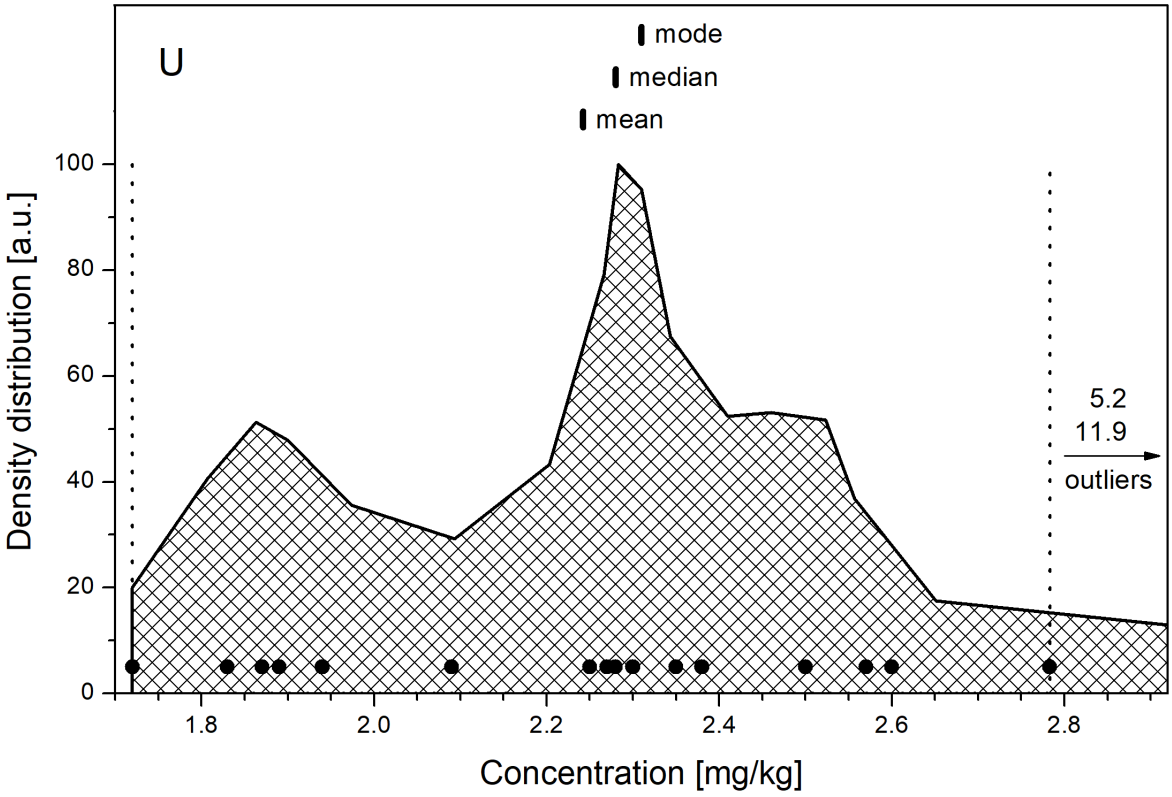

FIG. 110. The density distribution function for the analyte U (Siliceous material).

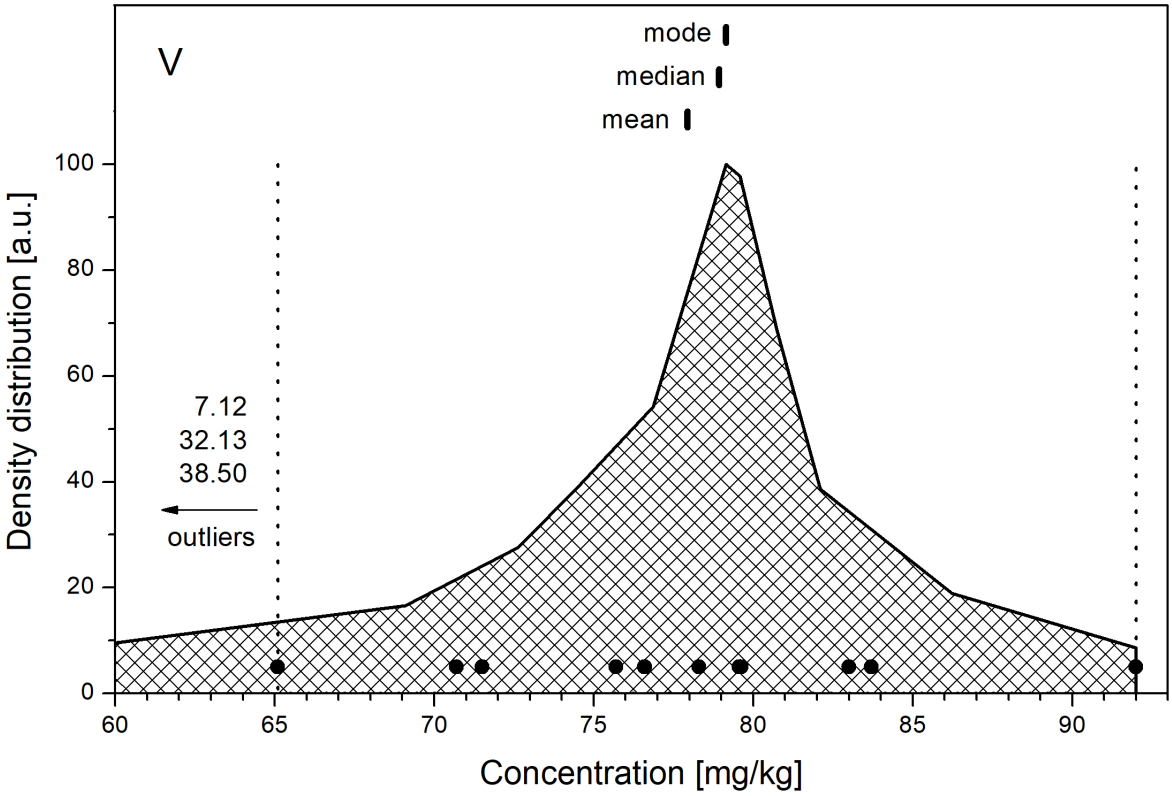

FIG. 111. The density distribution function for the analyte V (Siliceous material).

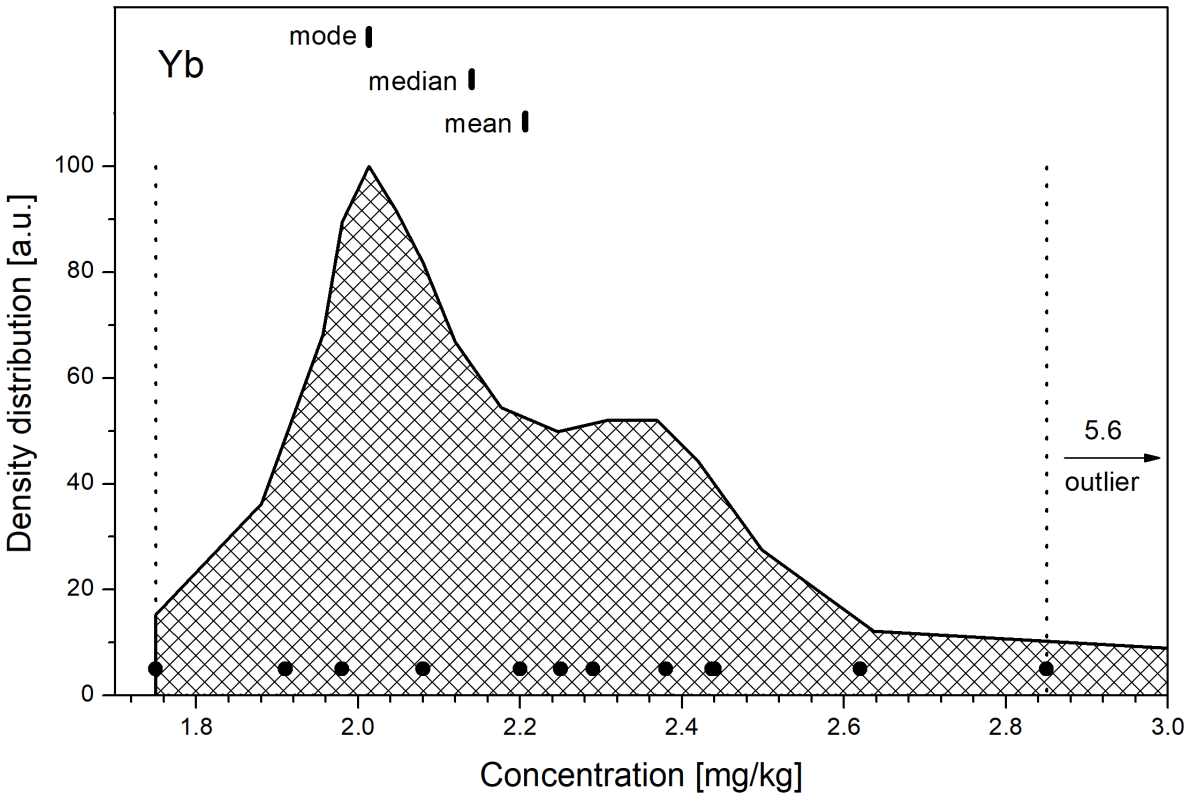

FIG. 112. The density distribution function for the analyte Yb (Siliceous material).

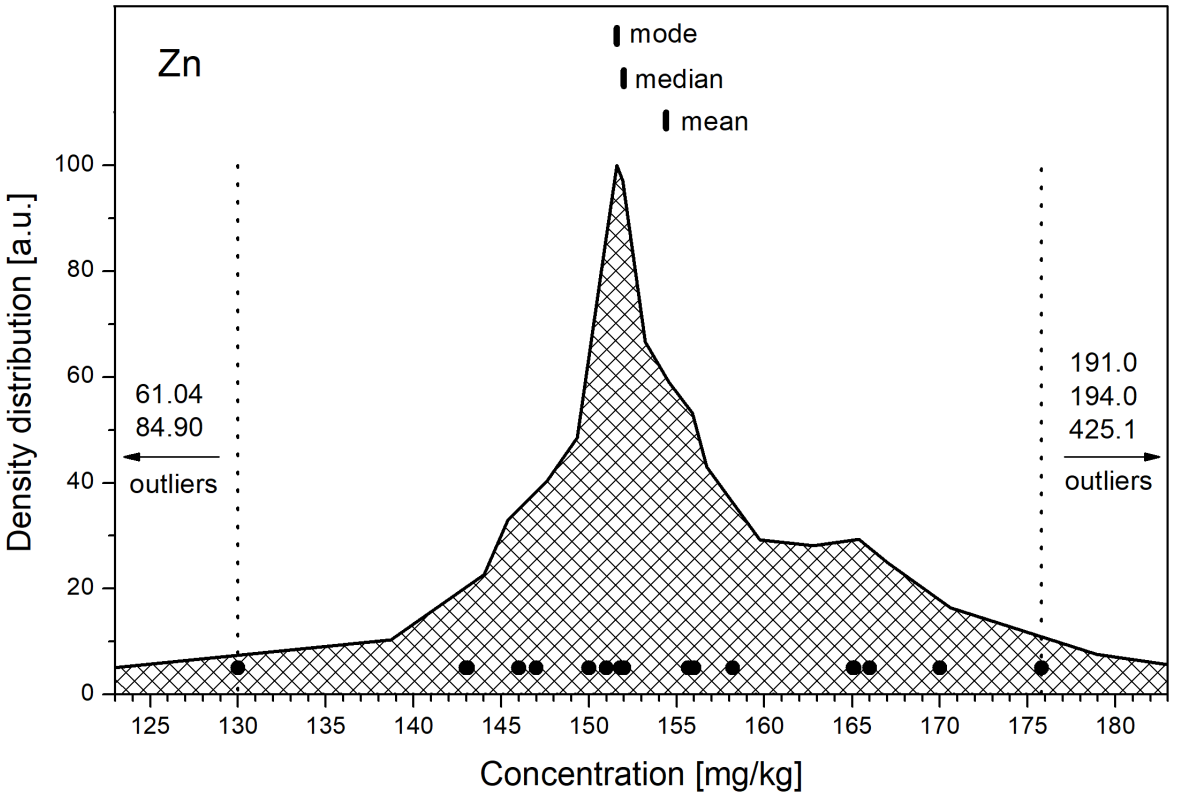

FIG. 113. The density distribution function for the analyte Zn (Siliceous material).

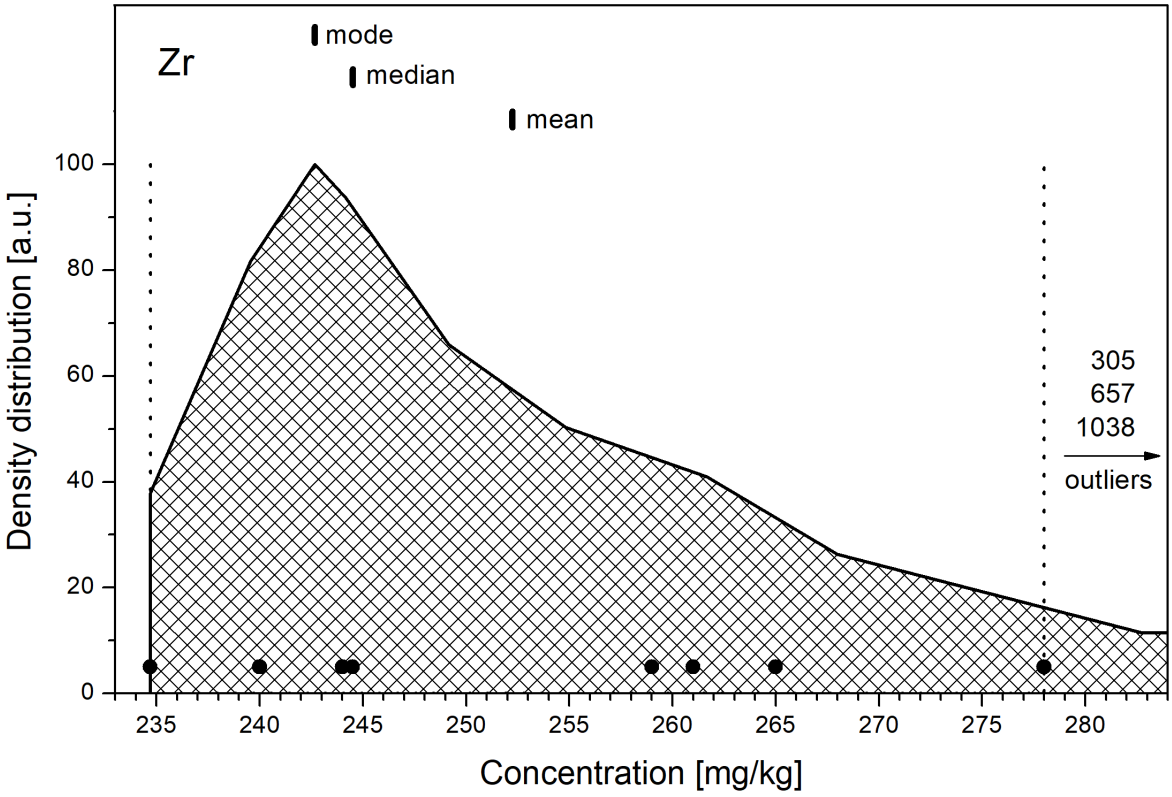

FIG. 114. The density distribution function for the analyte Zr (Siliceous material).

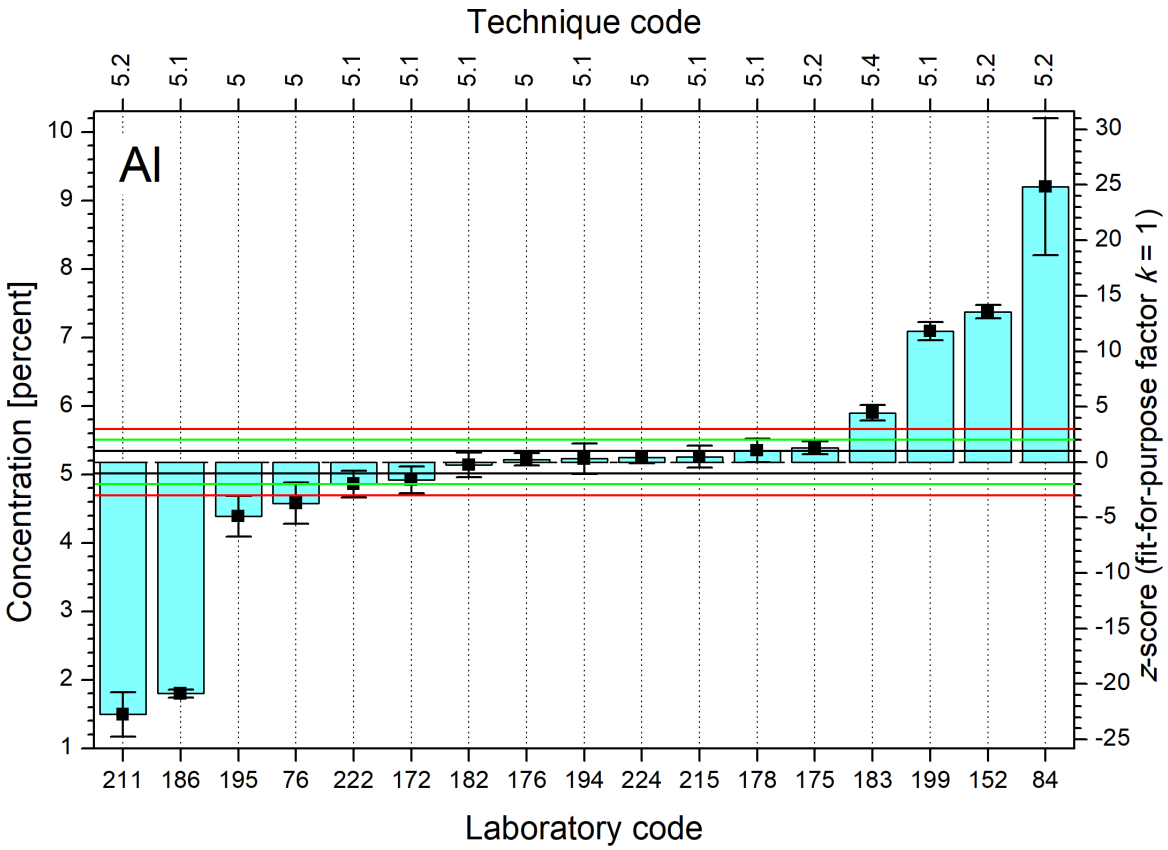

FIG. 115. Distributions of z-scores for analyte Al (Siliceous material).

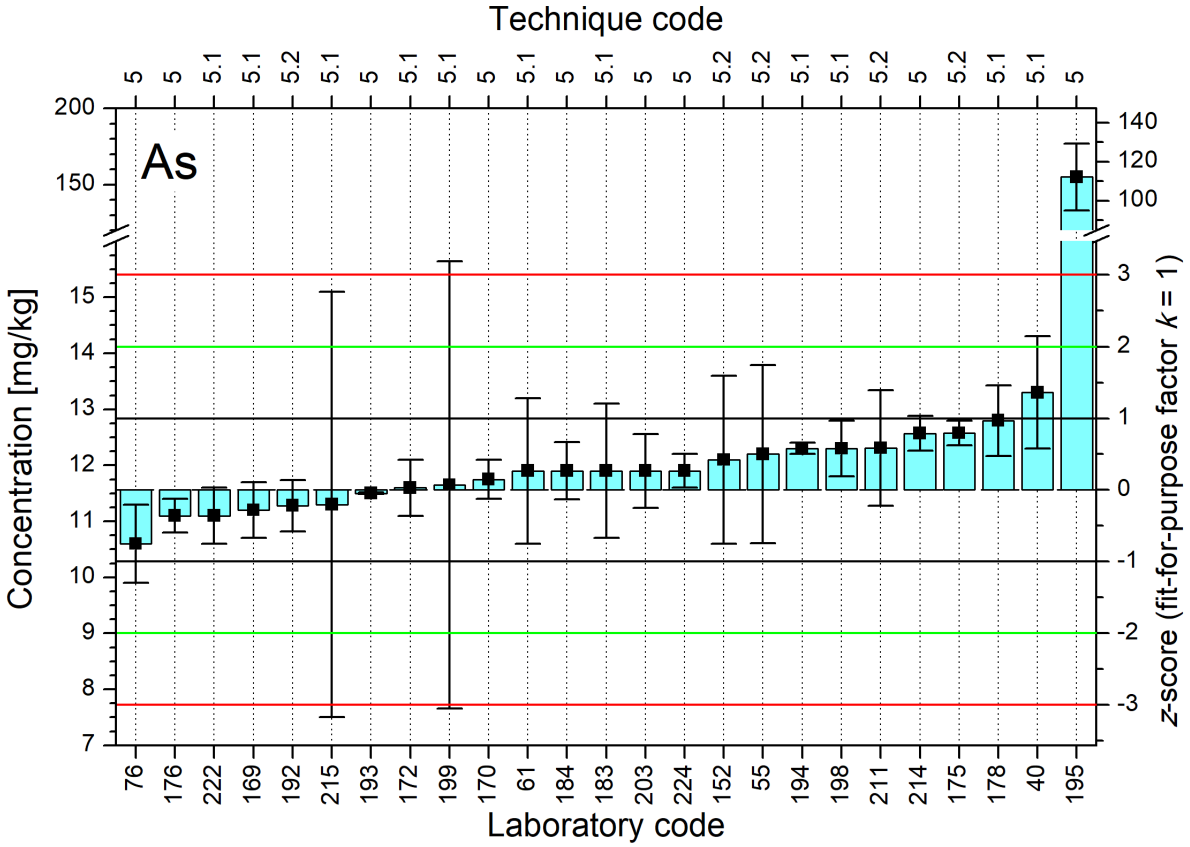

FIG. 116. Distributions of z-scores for analyte As (Siliceous material).

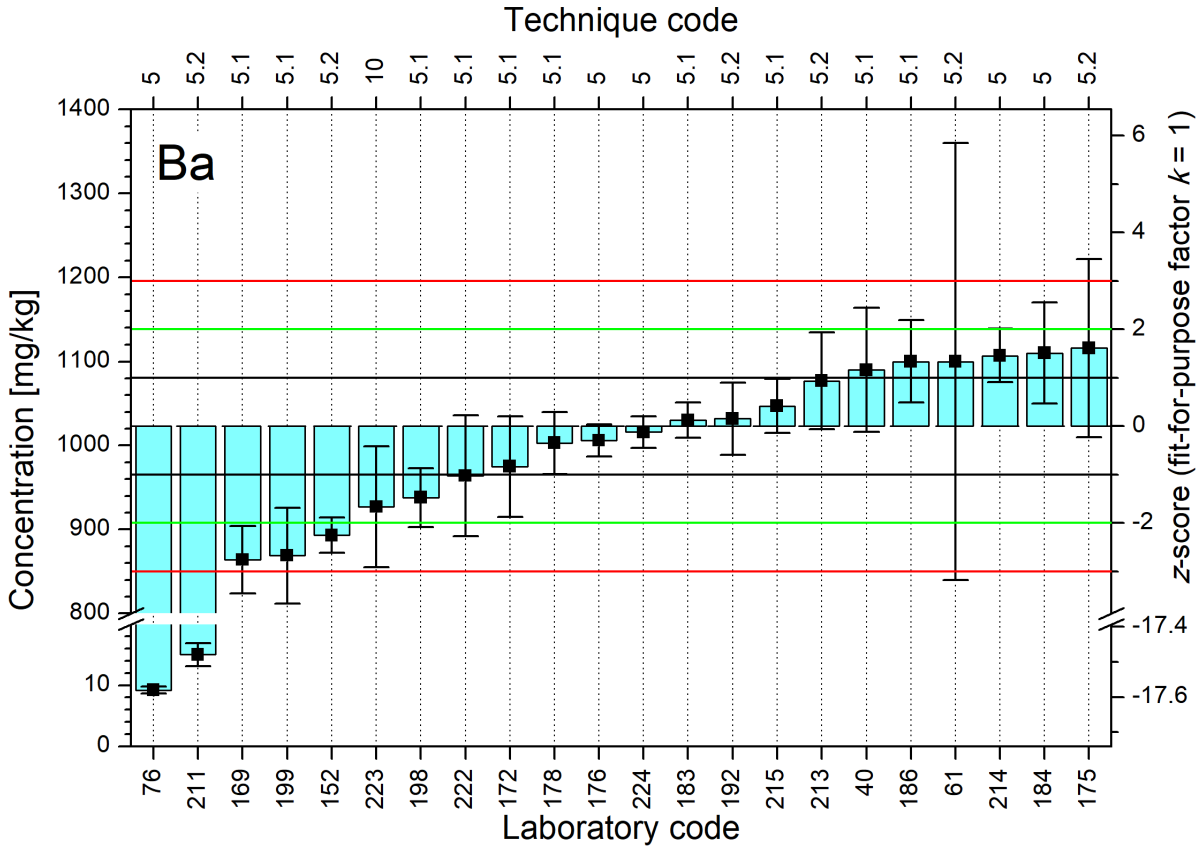

FIG. 117. Distributions of z-scores for analyte Ba (Siliceous material).

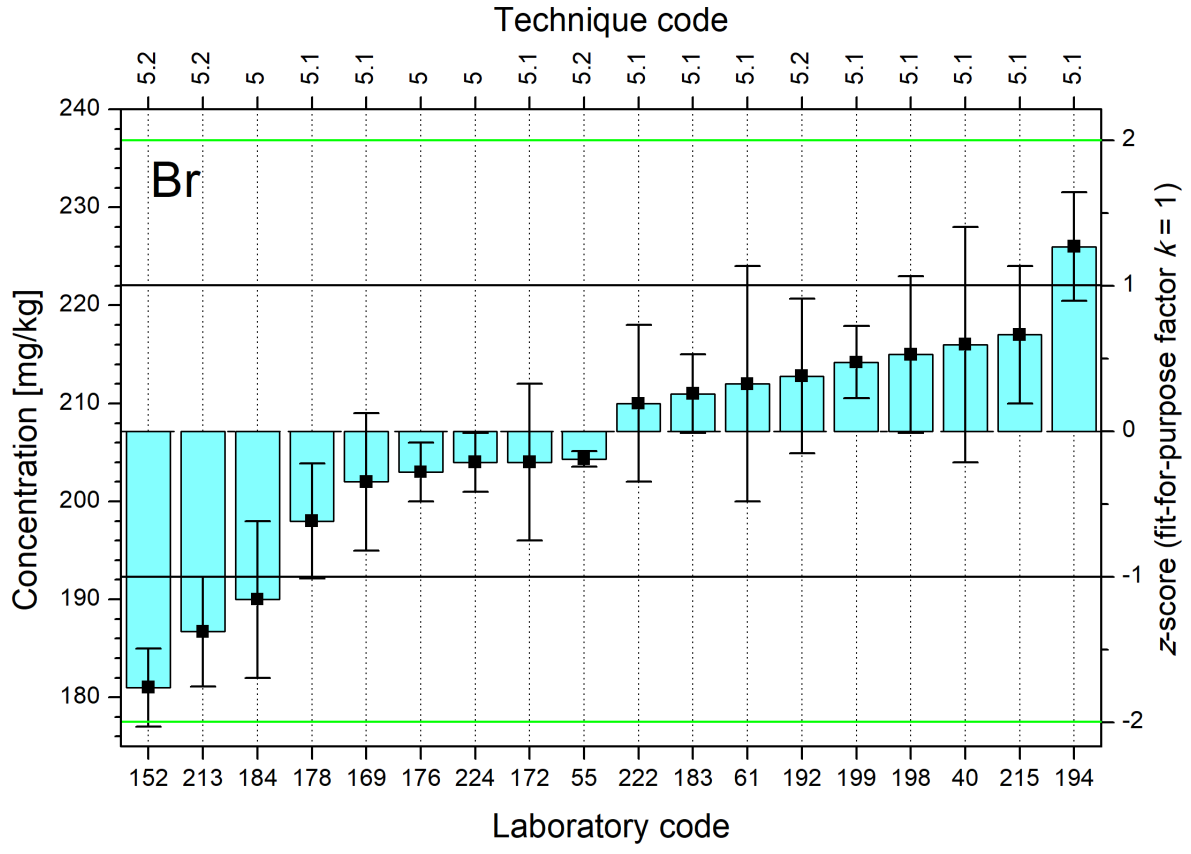

FIG. 118. Distributions of z-scores for analyte Br (Siliceous material).

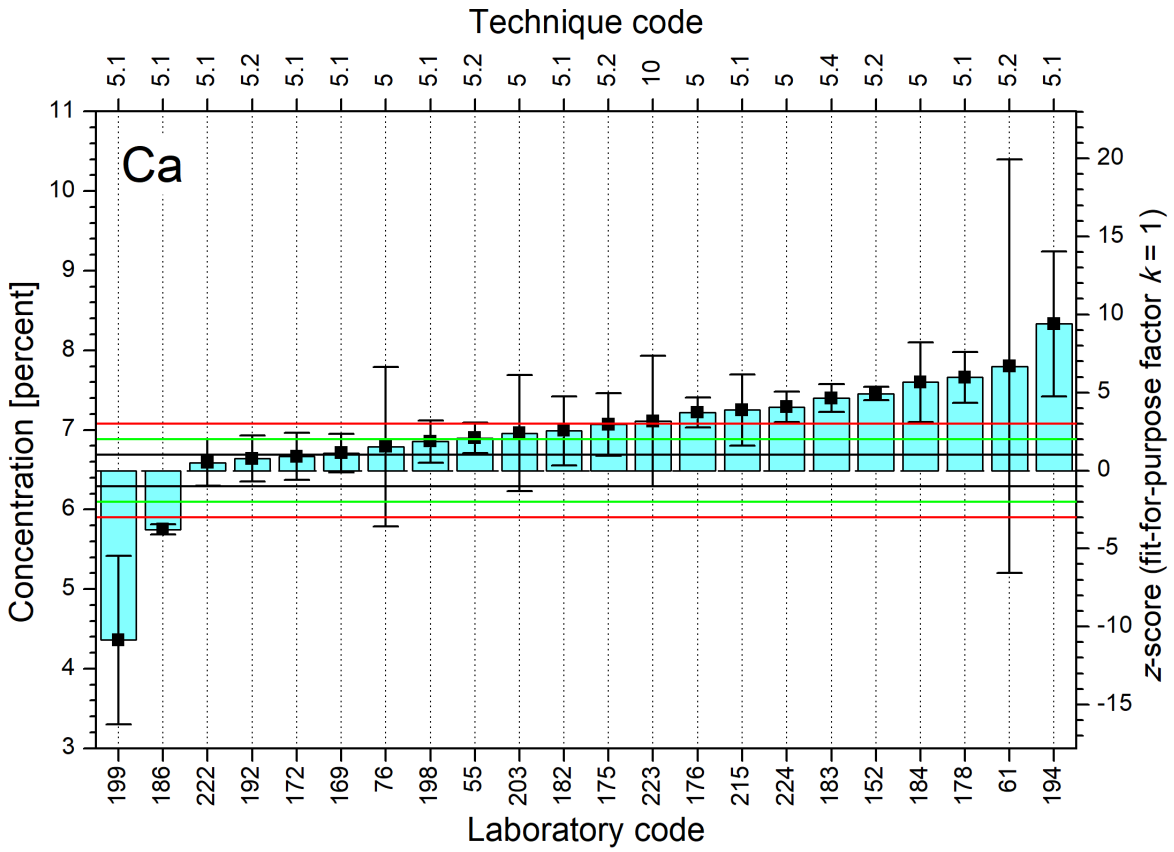

FIG. 119. Distributions of z-scores for analyte Ca (Siliceous material).

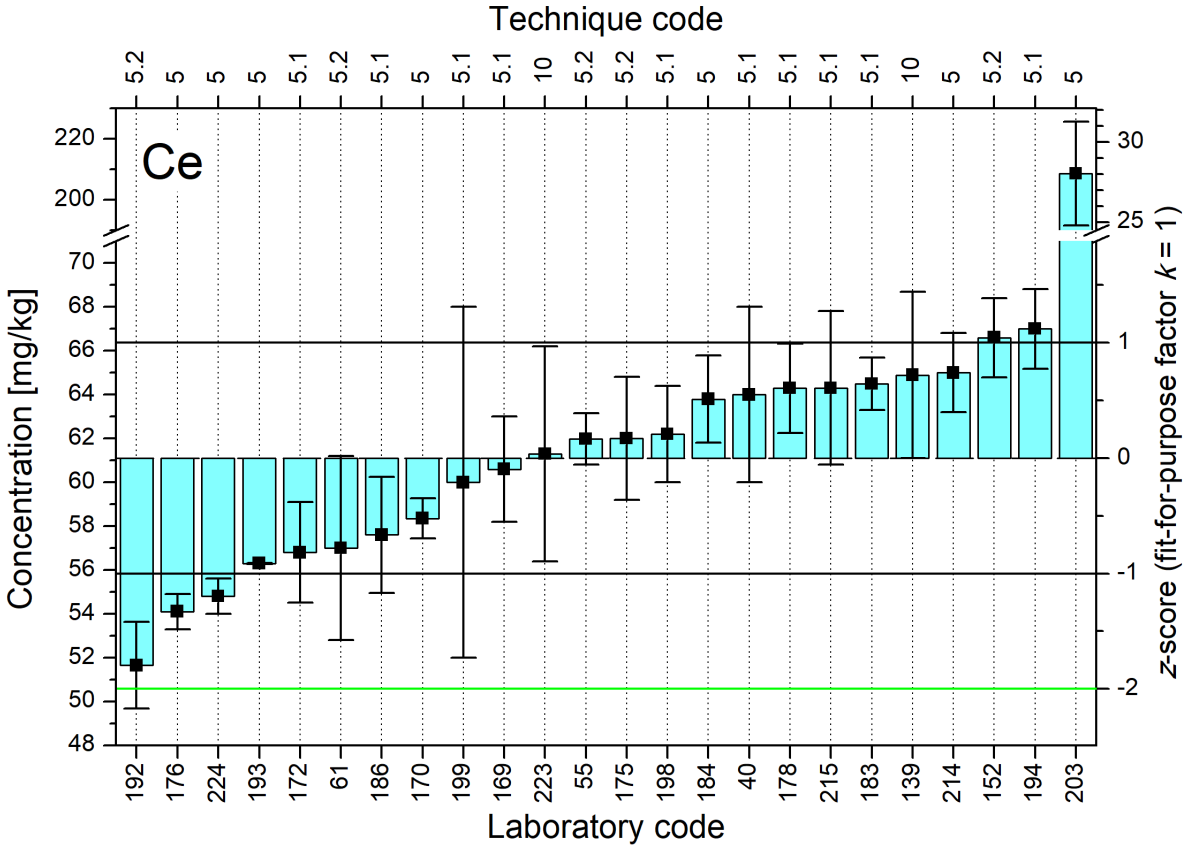

FIG. 120. Distributions of z-scores for analyte Ce (Siliceous material).

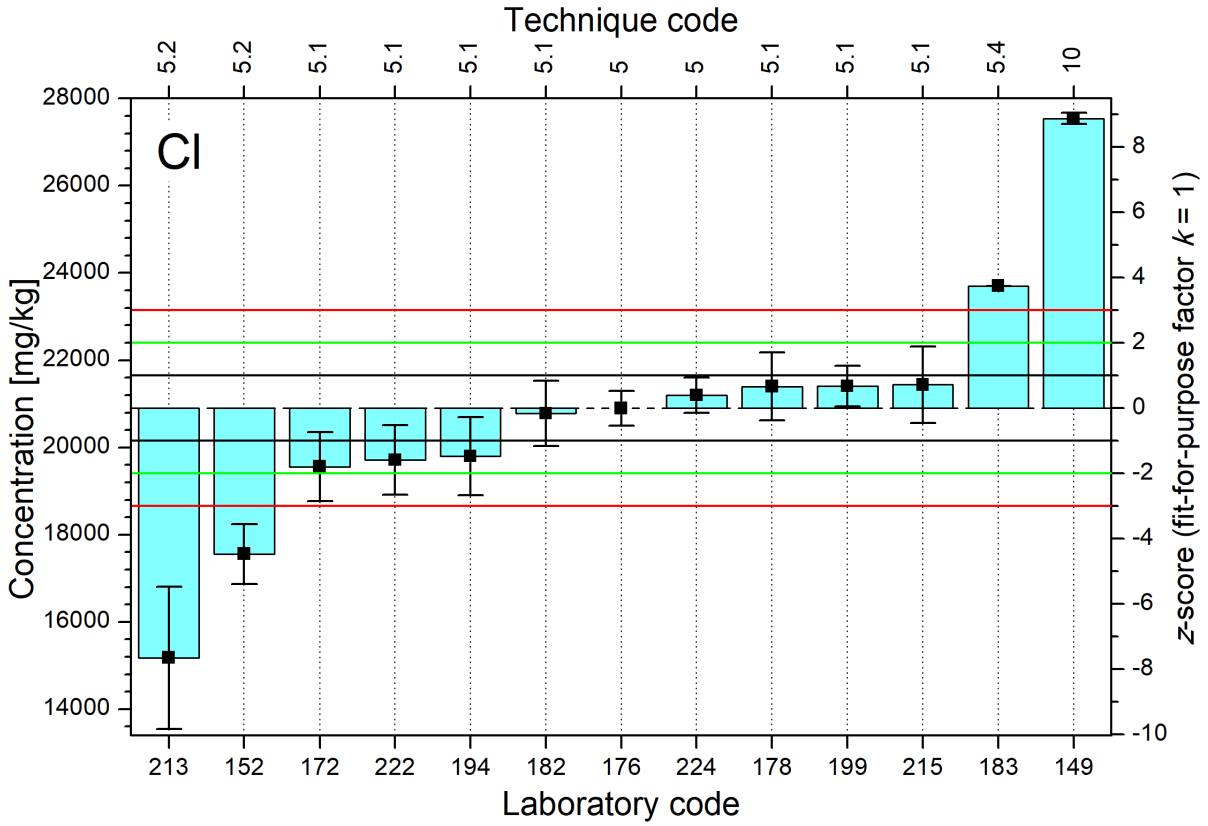

FIG. 121. Distributions of z-scores for analyte Cl (Siliceous material).

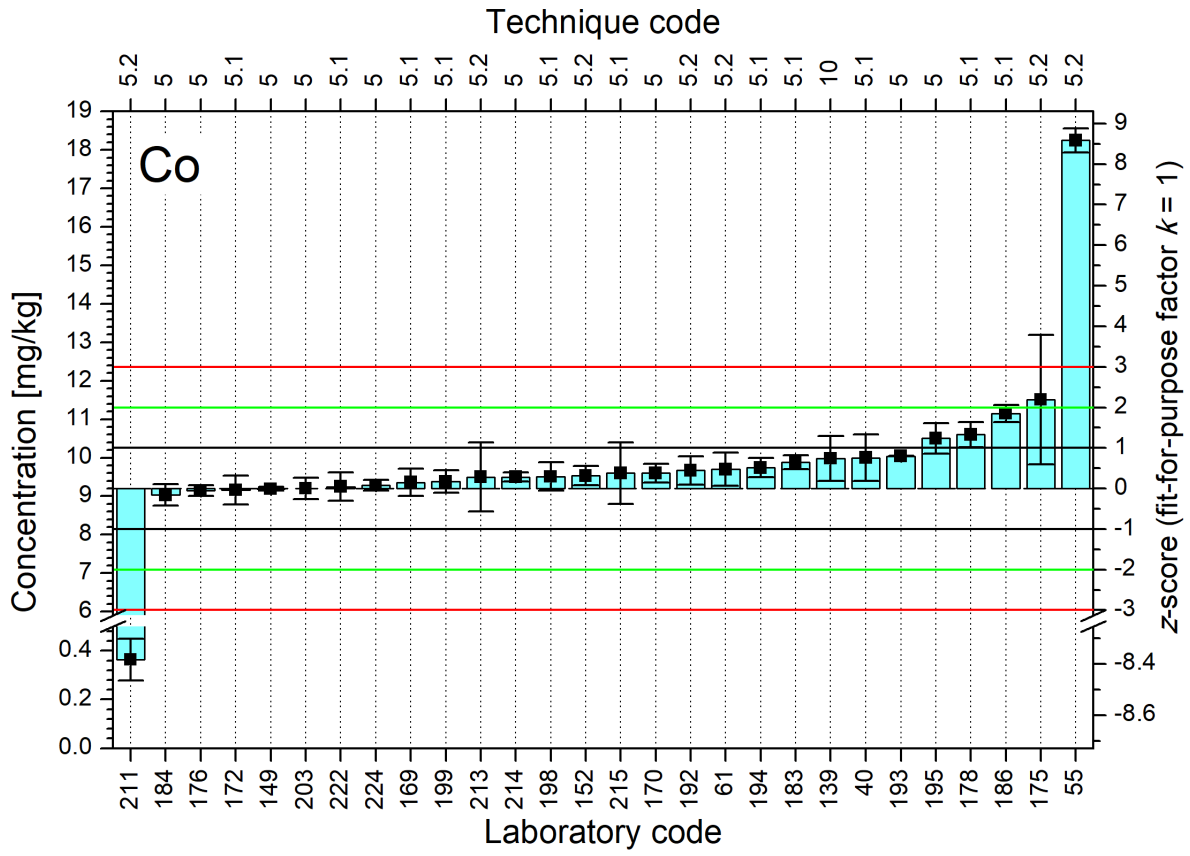

FIG. 122. Distributions of z-scores for analyte Co (Siliceous material).

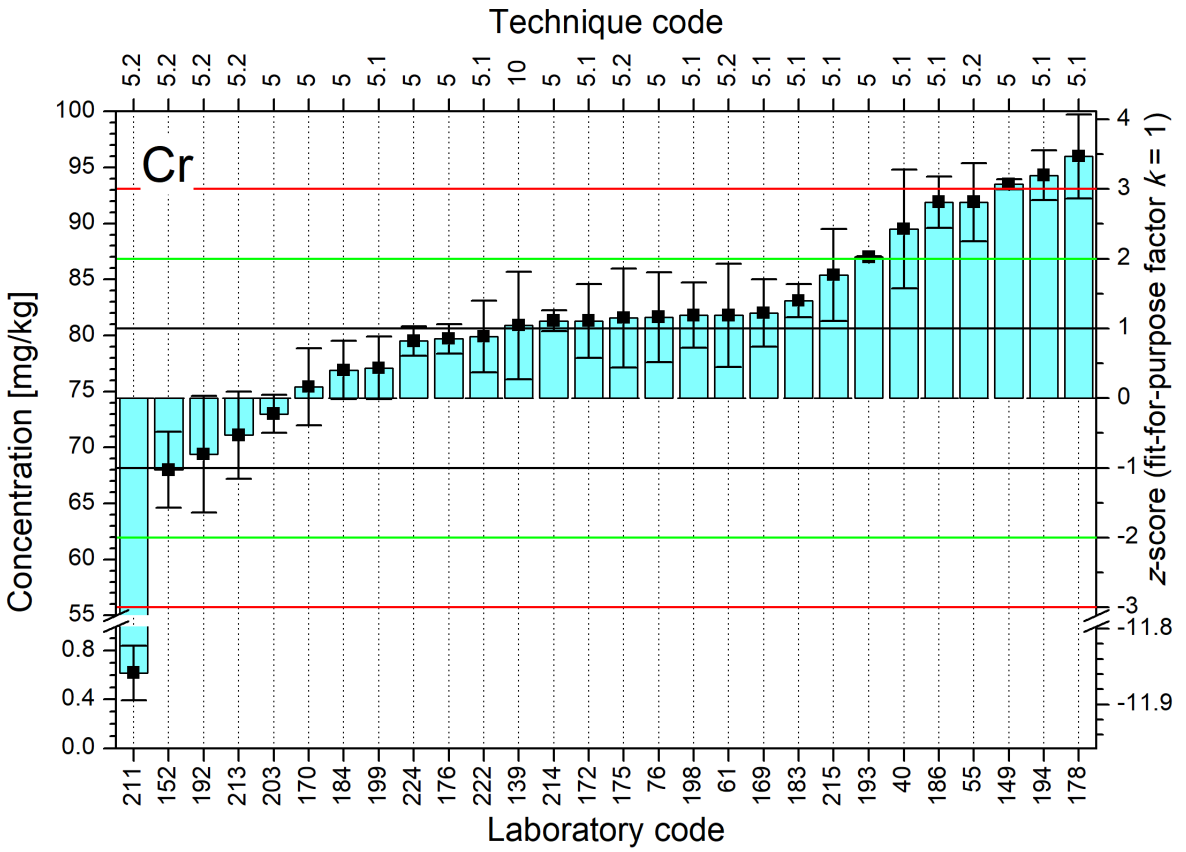

FIG. 123. Distributions of z-scores for analyte Cr (Siliceous material).

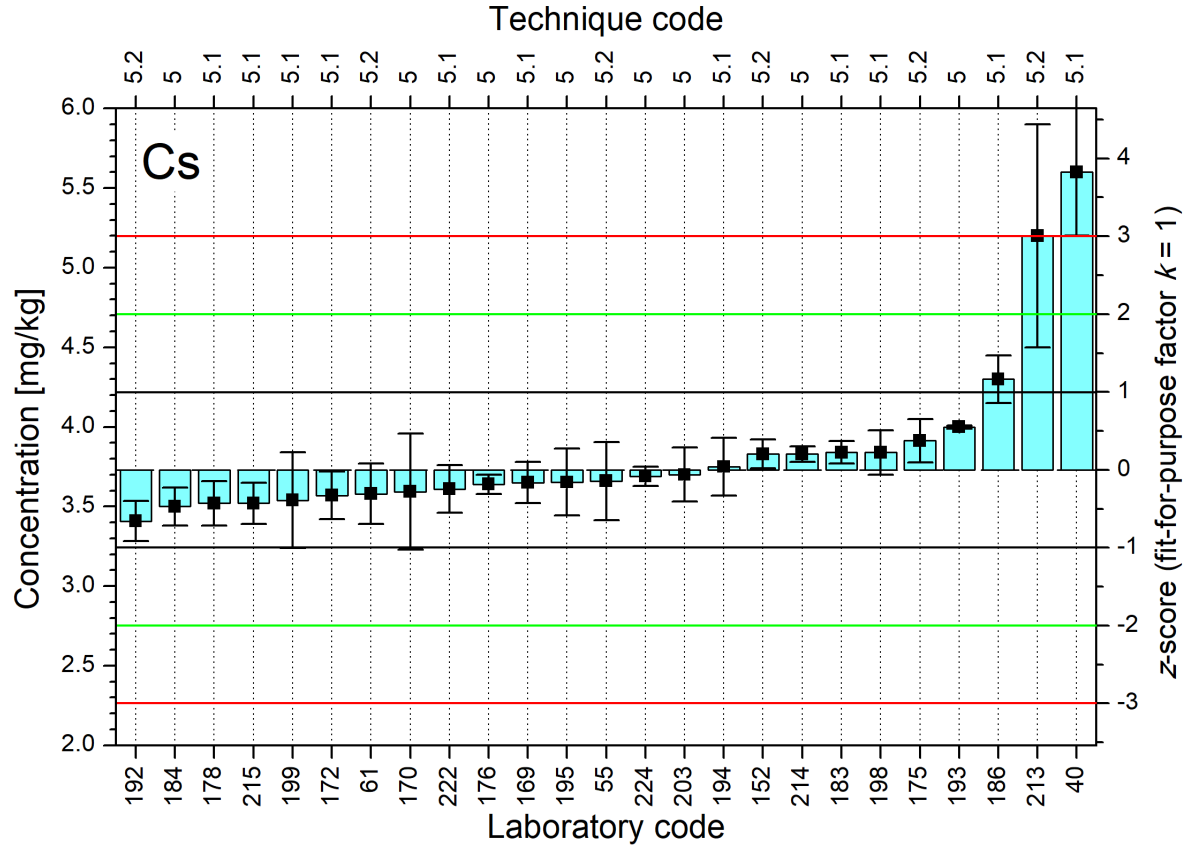

FIG. 124. Distributions of z-scores for analyte Cs (Siliceous material).

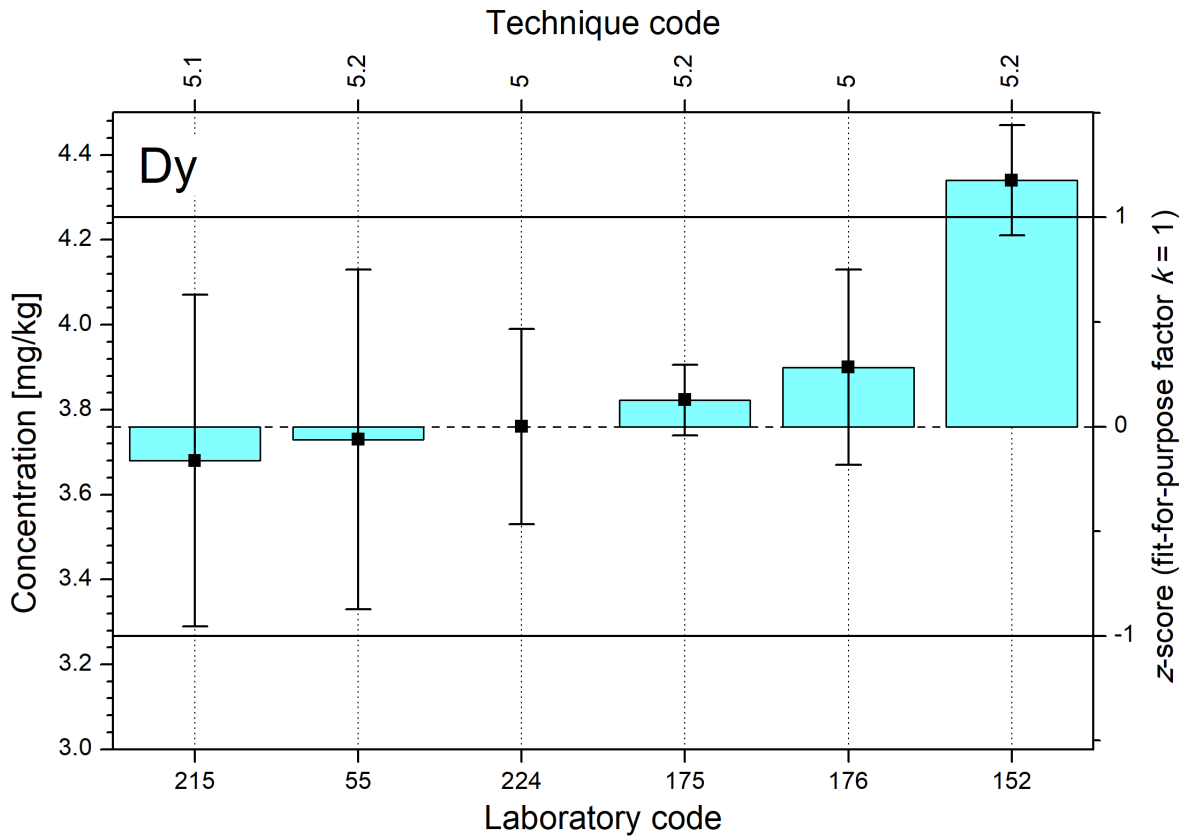

FIG. 125. Distributions of z-scores for analyte Dy (Siliceous material).

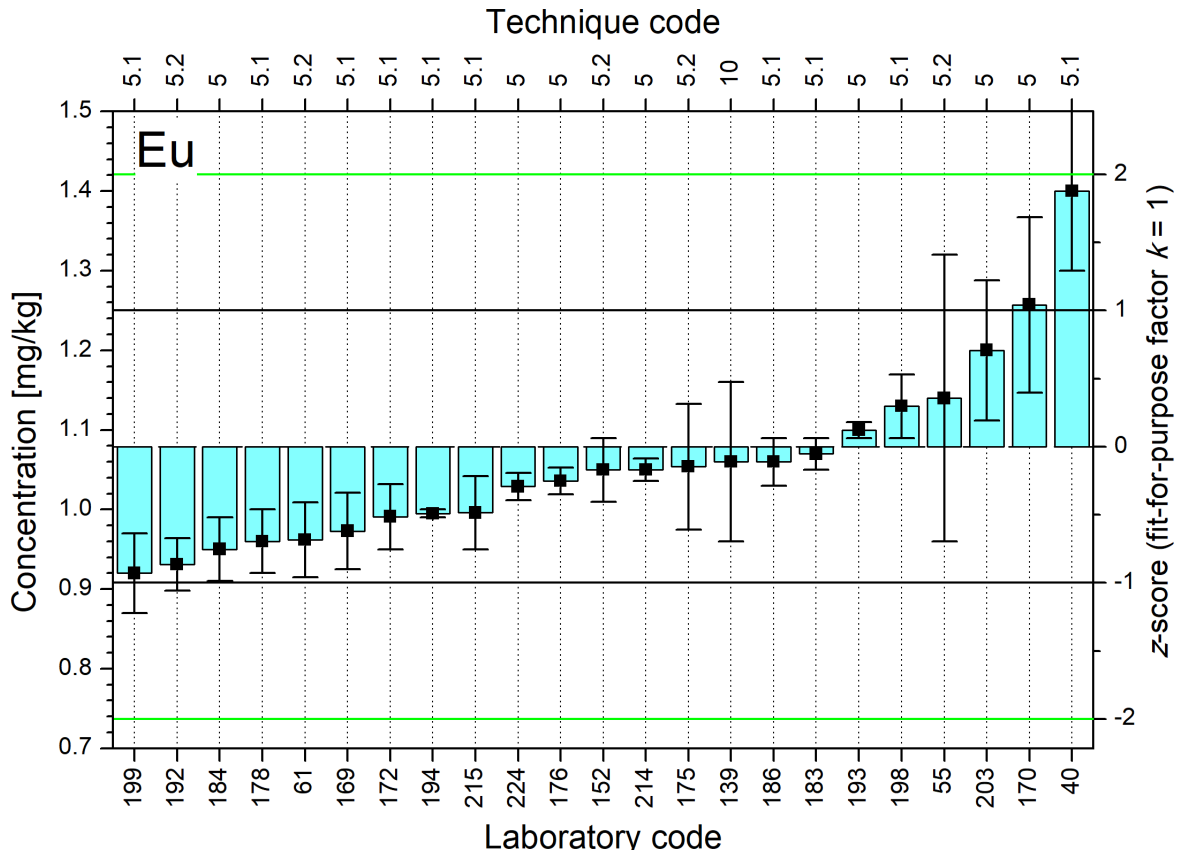

FIG. 126. Distributions of z-scores for analyte Eu (Siliceous material).

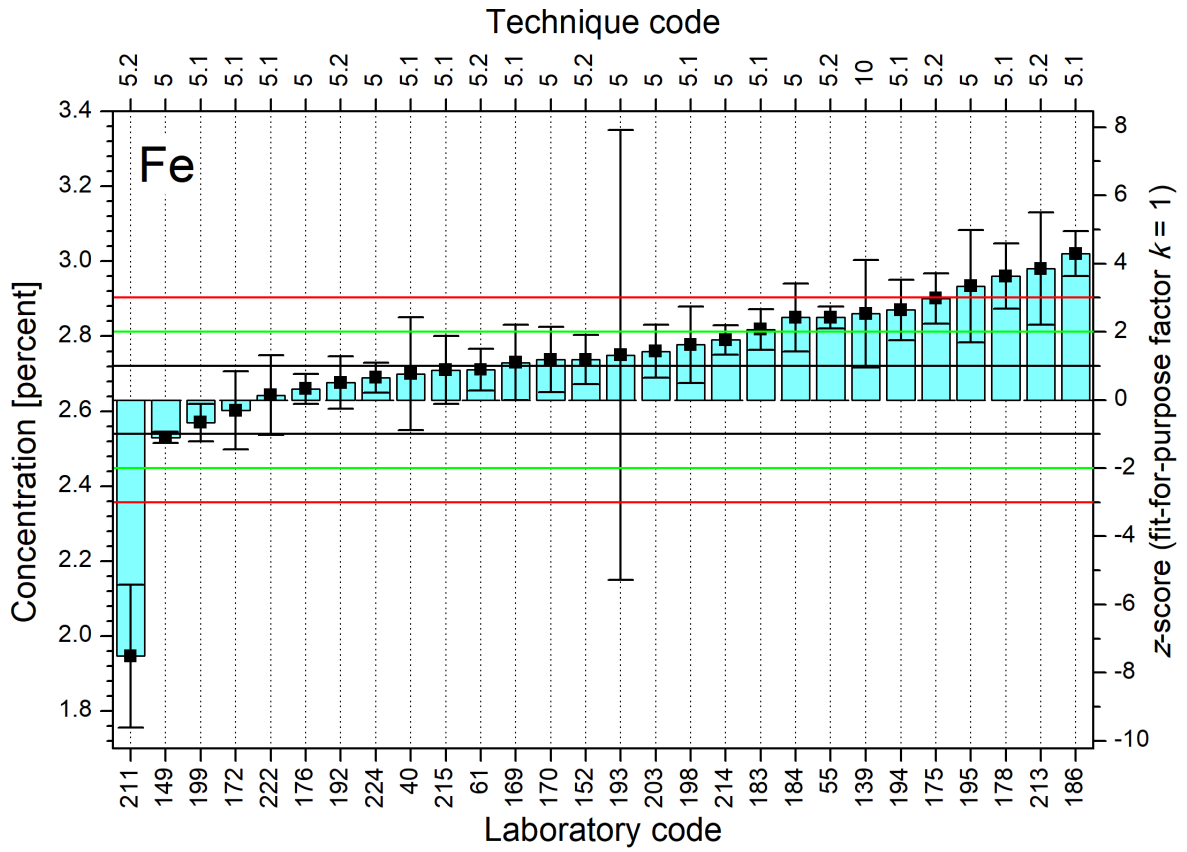

FIG. 127. Distributions of z-scores for analyte Fe (Siliceous material).

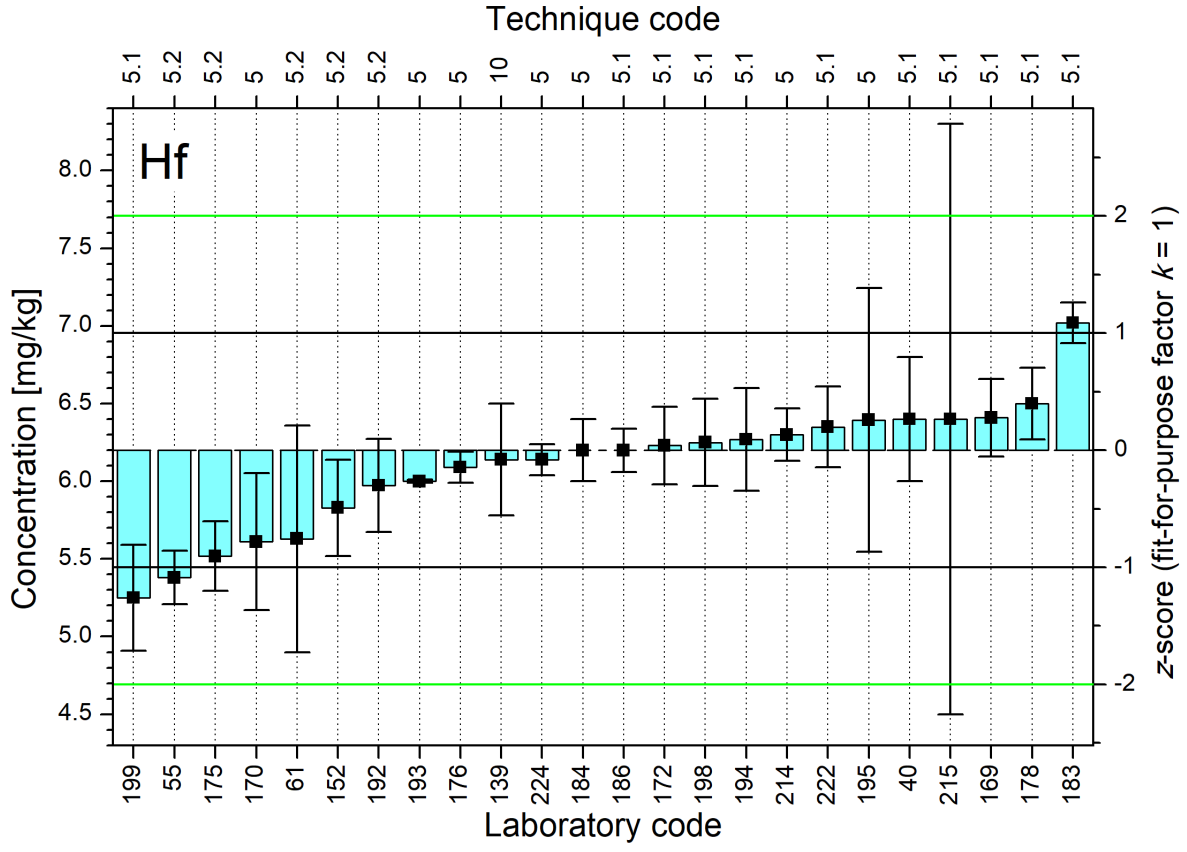

FIG. 128. Distributions of z-scores for analyte Hf (Siliceous material).

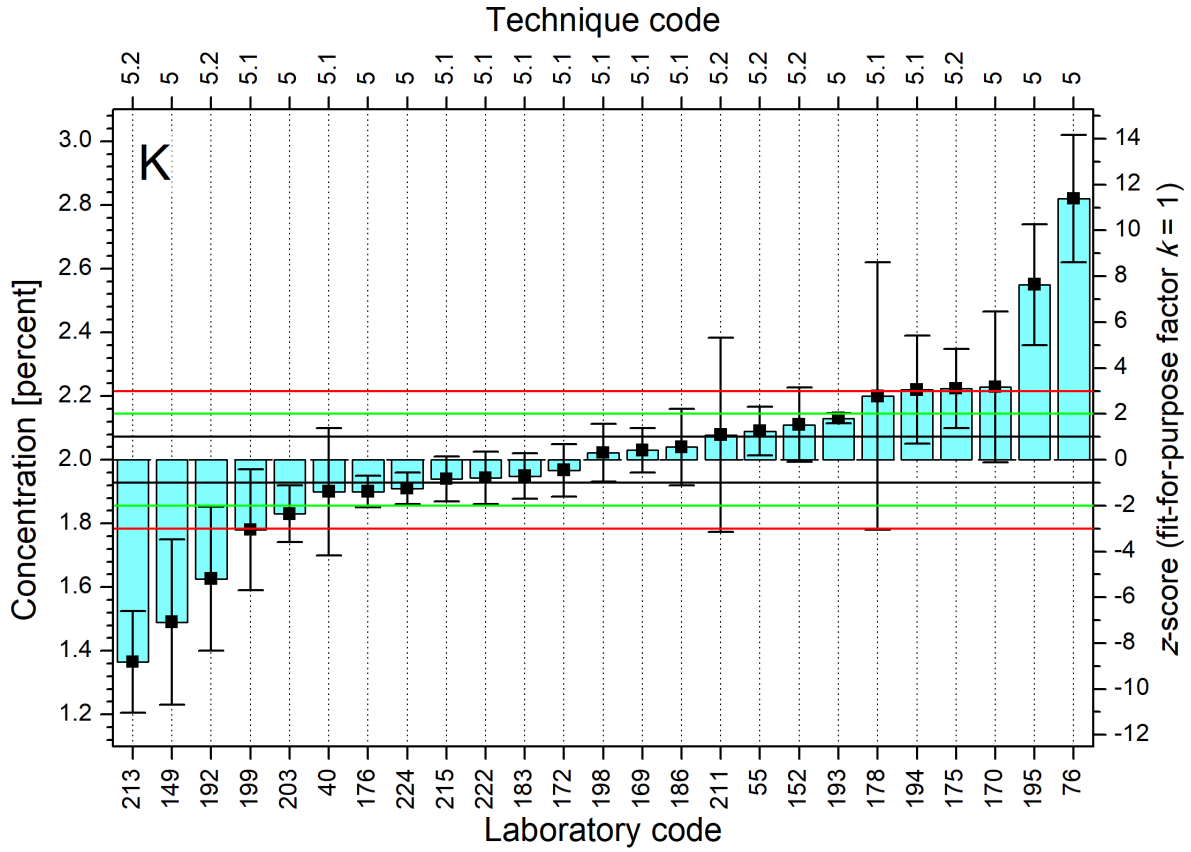

FIG. 129. Distributions of z-scores for analyte K (Siliceous material).

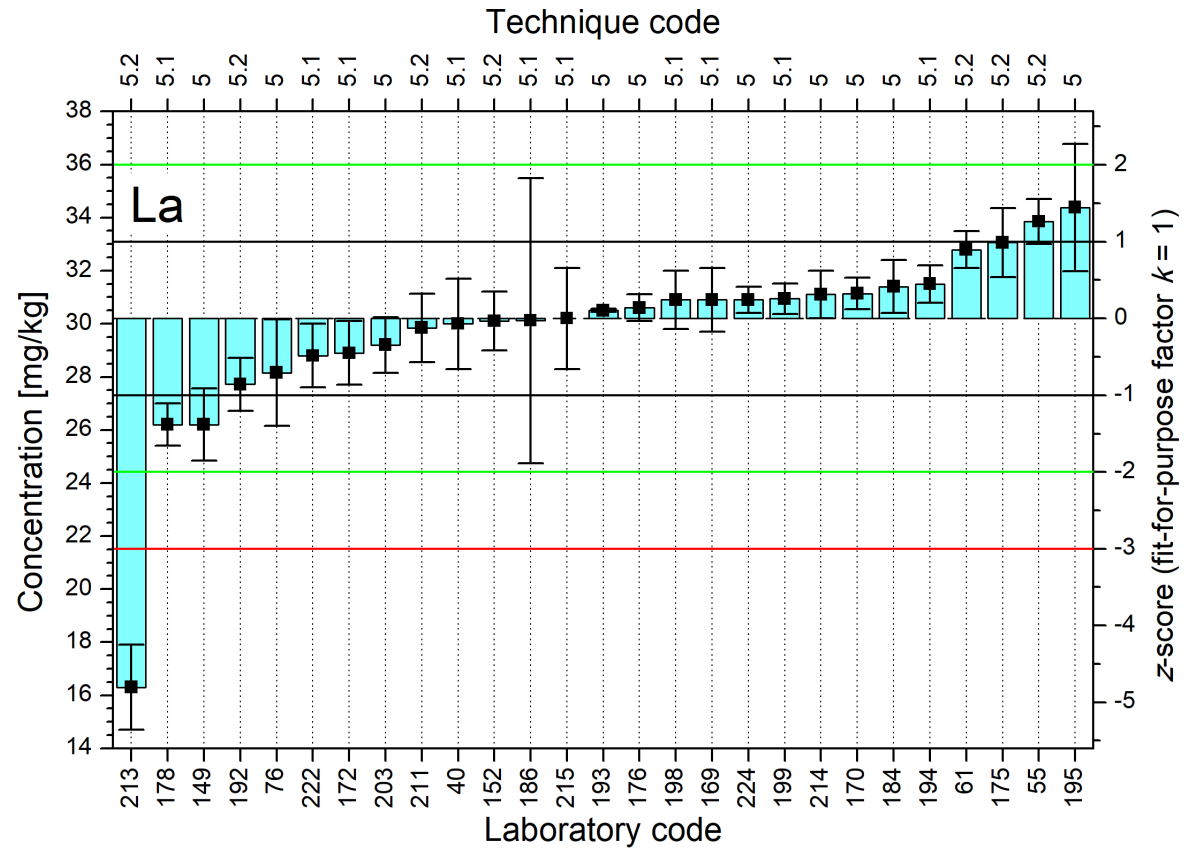

FIG. 130. Distributions of z-scores for analyte La (Siliceous material).

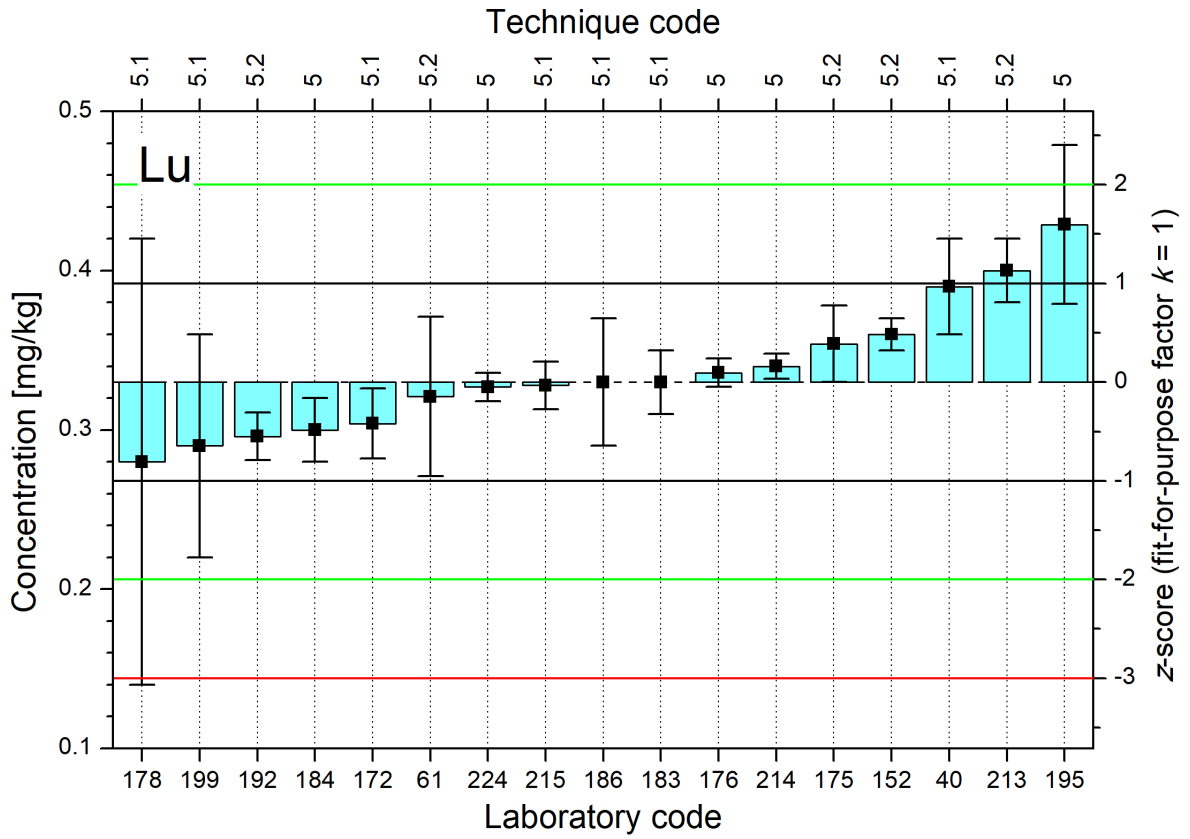

FIG. 131. Distributions of z-scores for analyte Lu (Siliceous material).

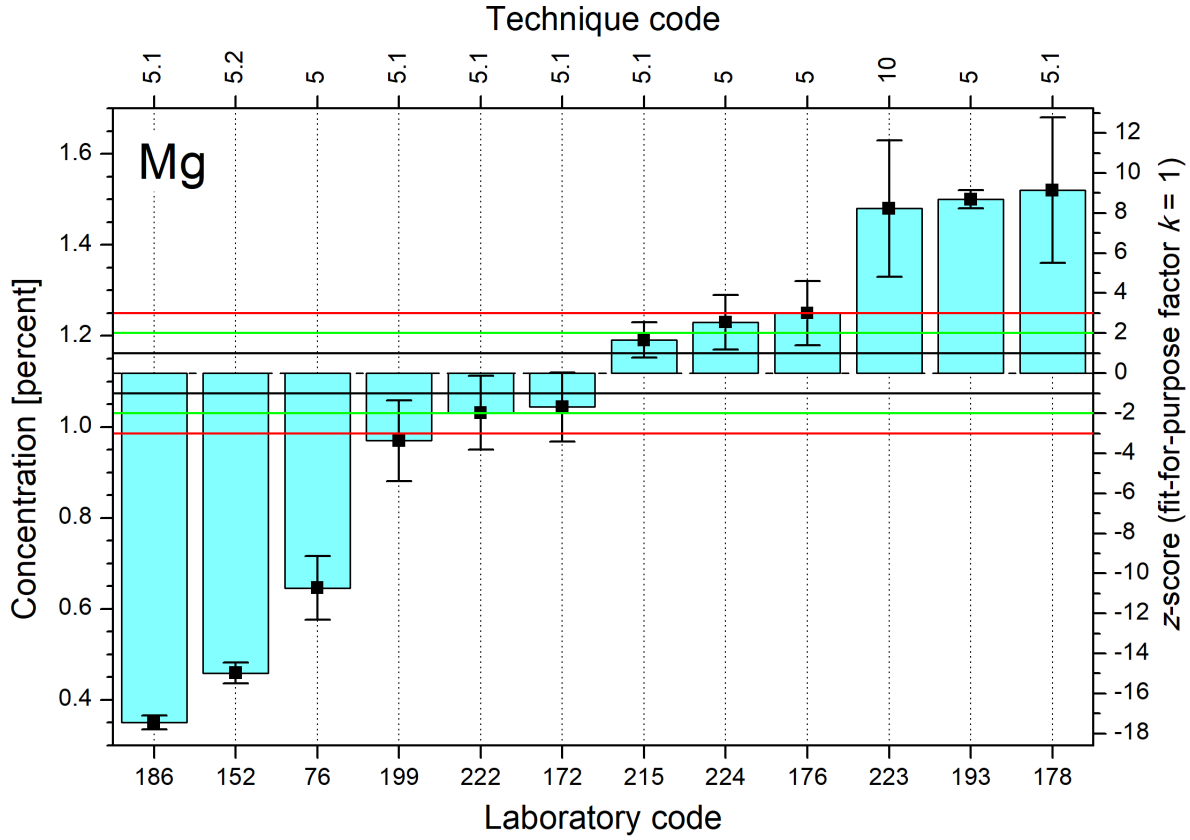

FIG. 132. Distributions of z-scores for analyte Mg (Siliceous material).

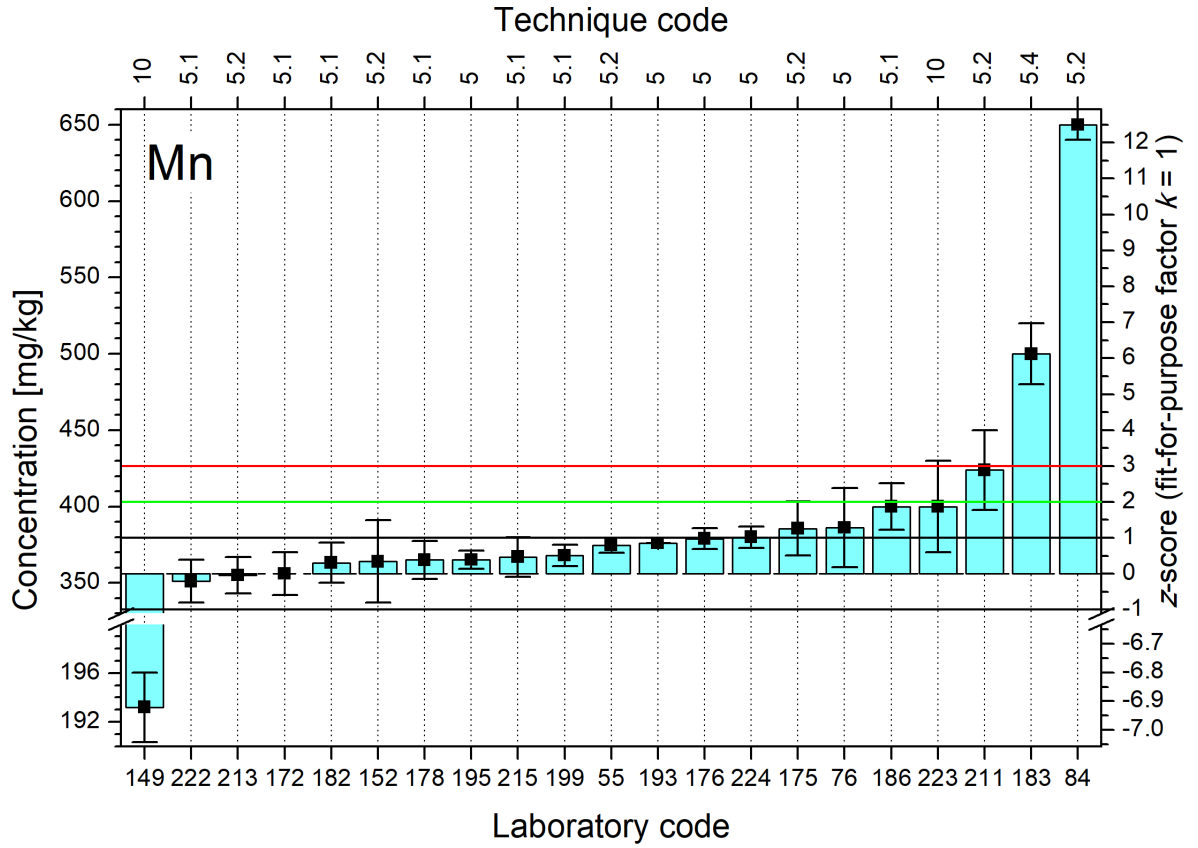

FIG. 133. Distributions of z-scores for analyte Mn (Siliceous material).

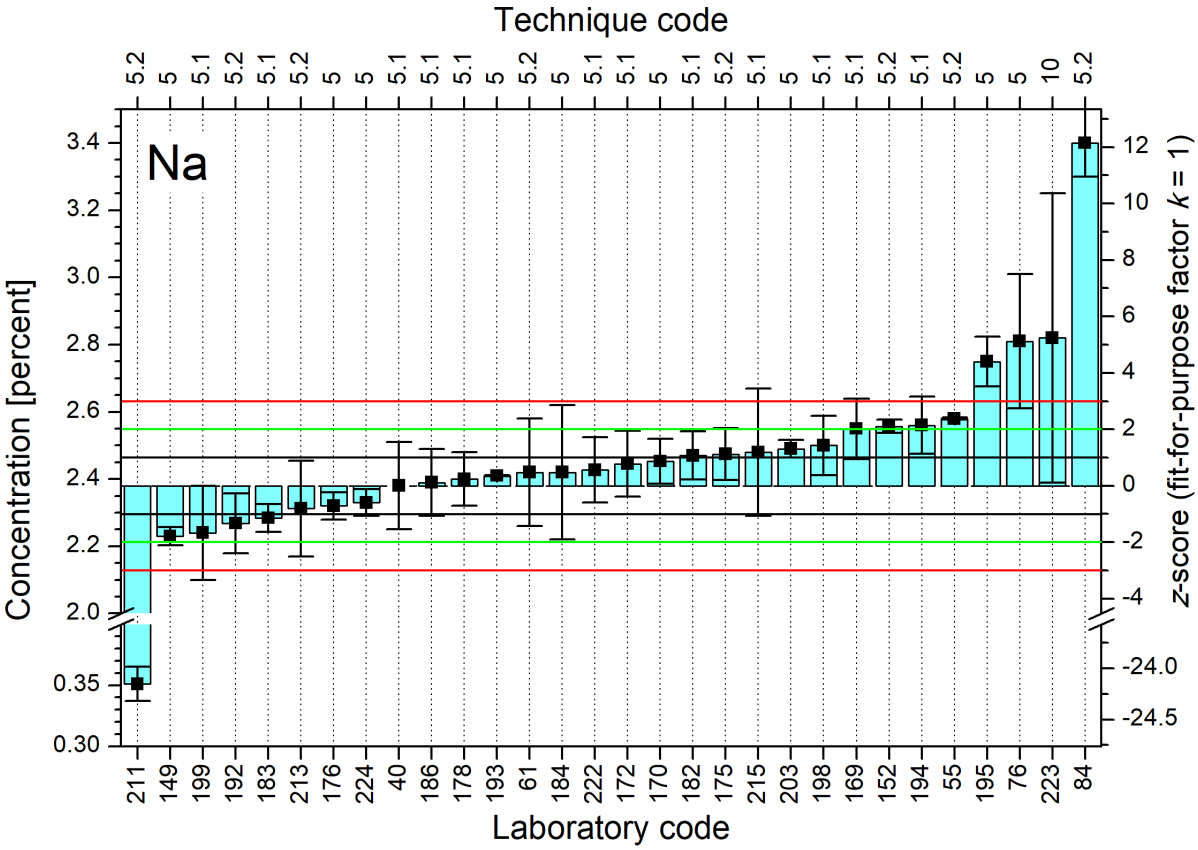

FIG. 134. Distributions of z-scores for analyte Na (Siliceous material).

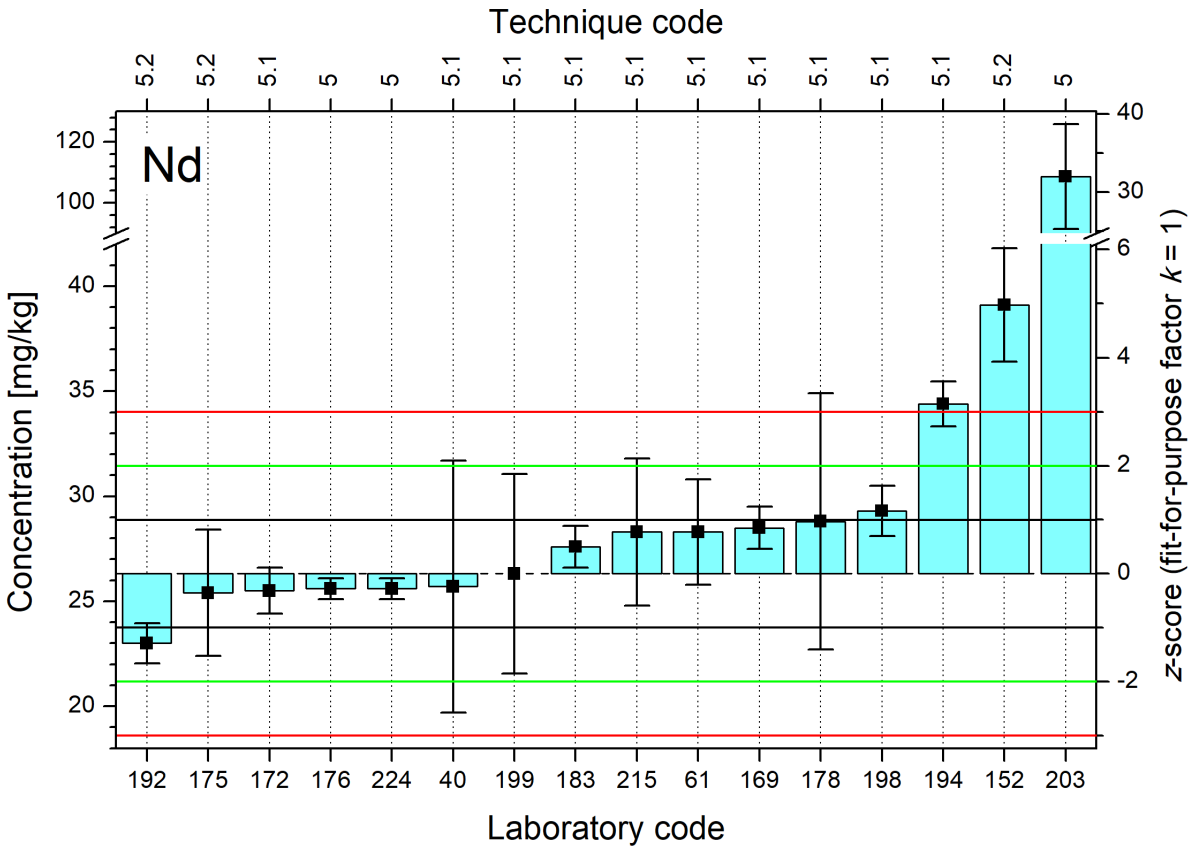

FIG. 135. Distributions of z-scores for analyte Nd (Siliceous material).

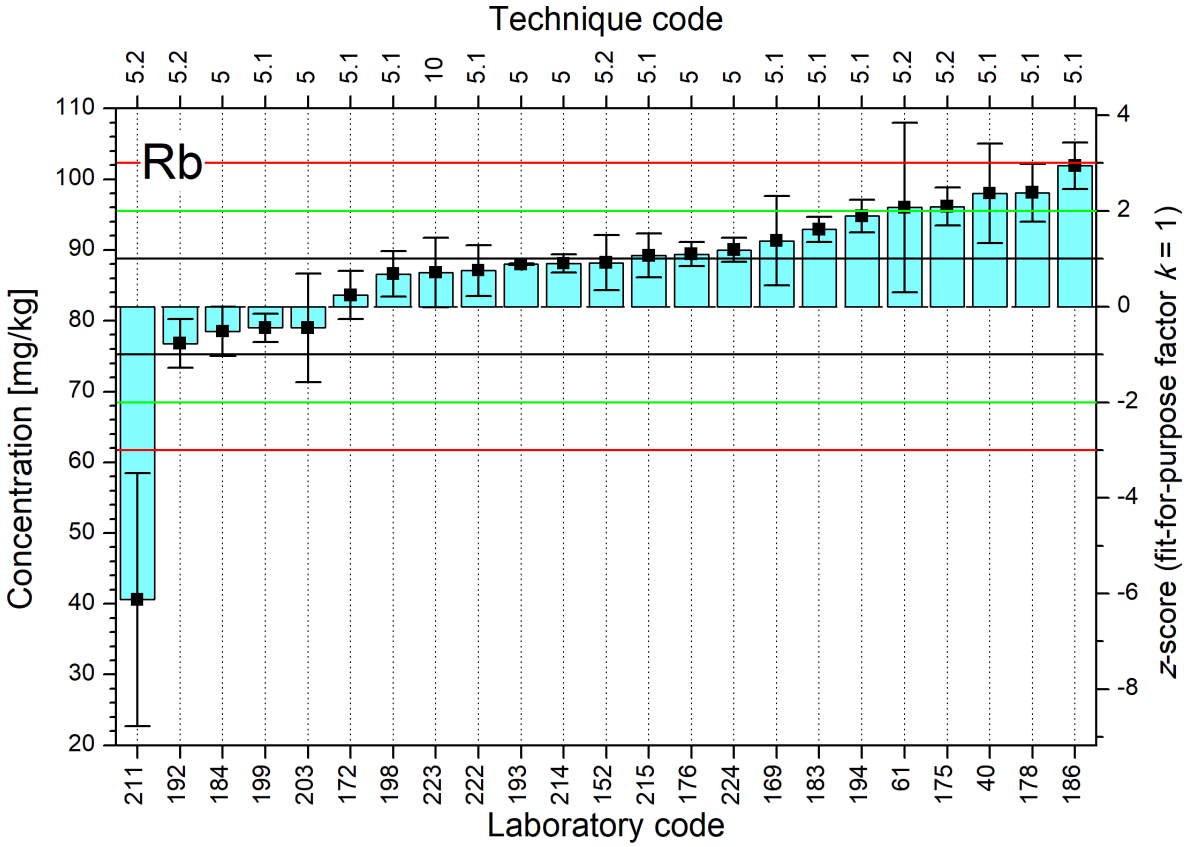

FIG. 136. Distributions of z-scores for analyte Rb (Siliceous material).

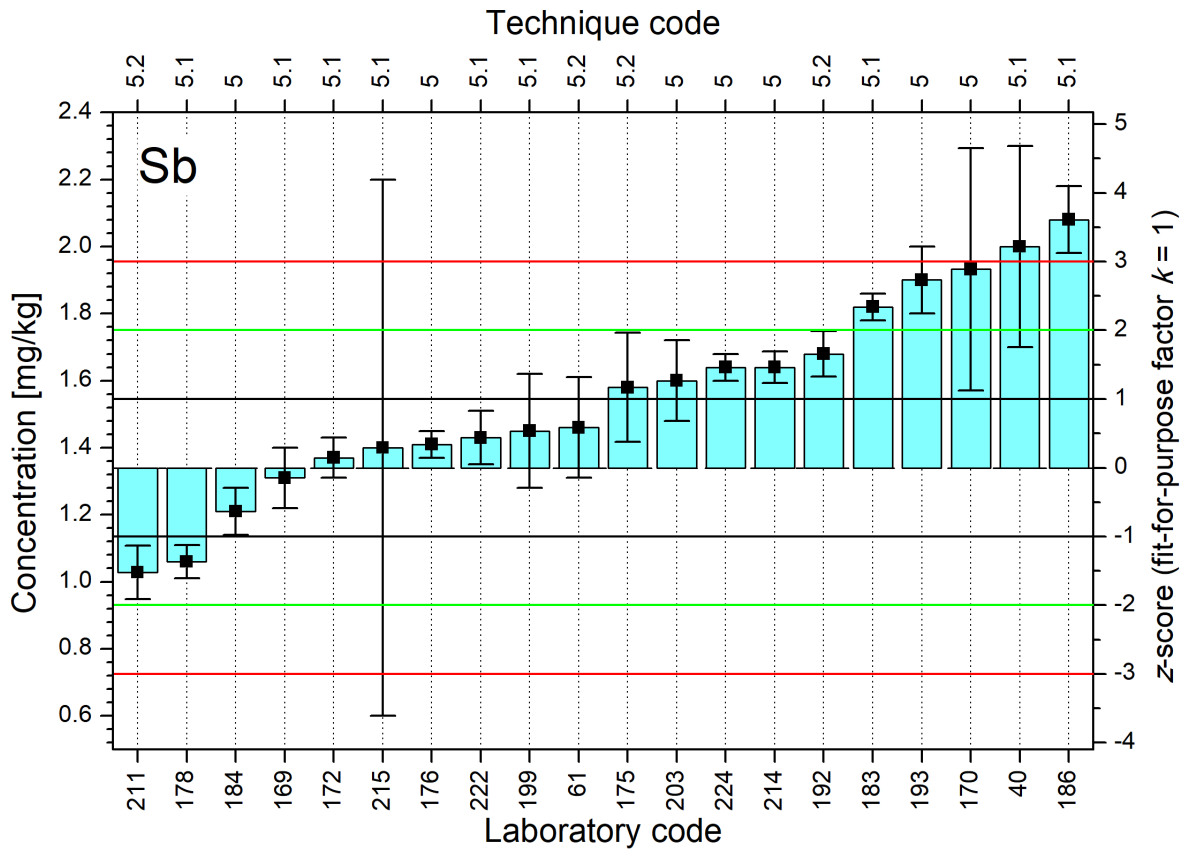

FIG. 137. Distributions of z-scores for analyte Sb (Siliceous material).

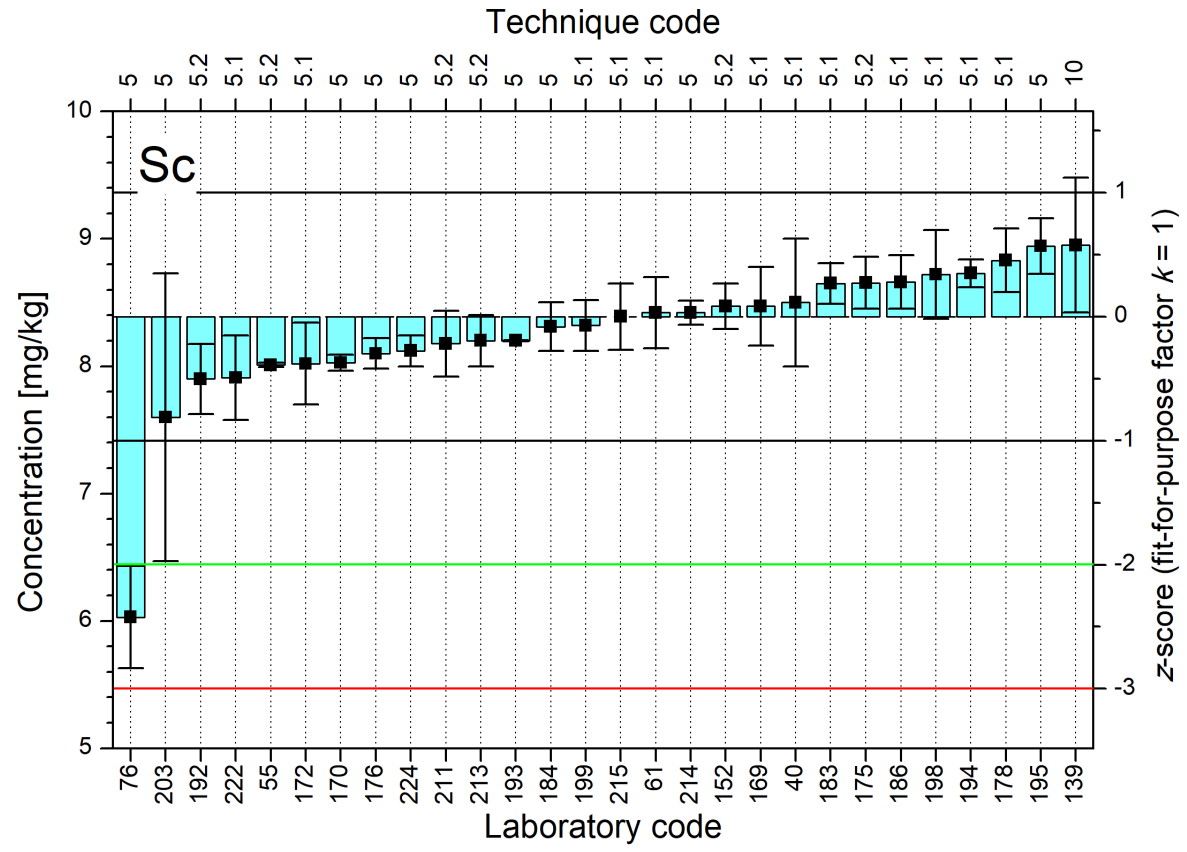

FIG. 138. Distributions of z-scores for analyte Sc (Siliceous material).

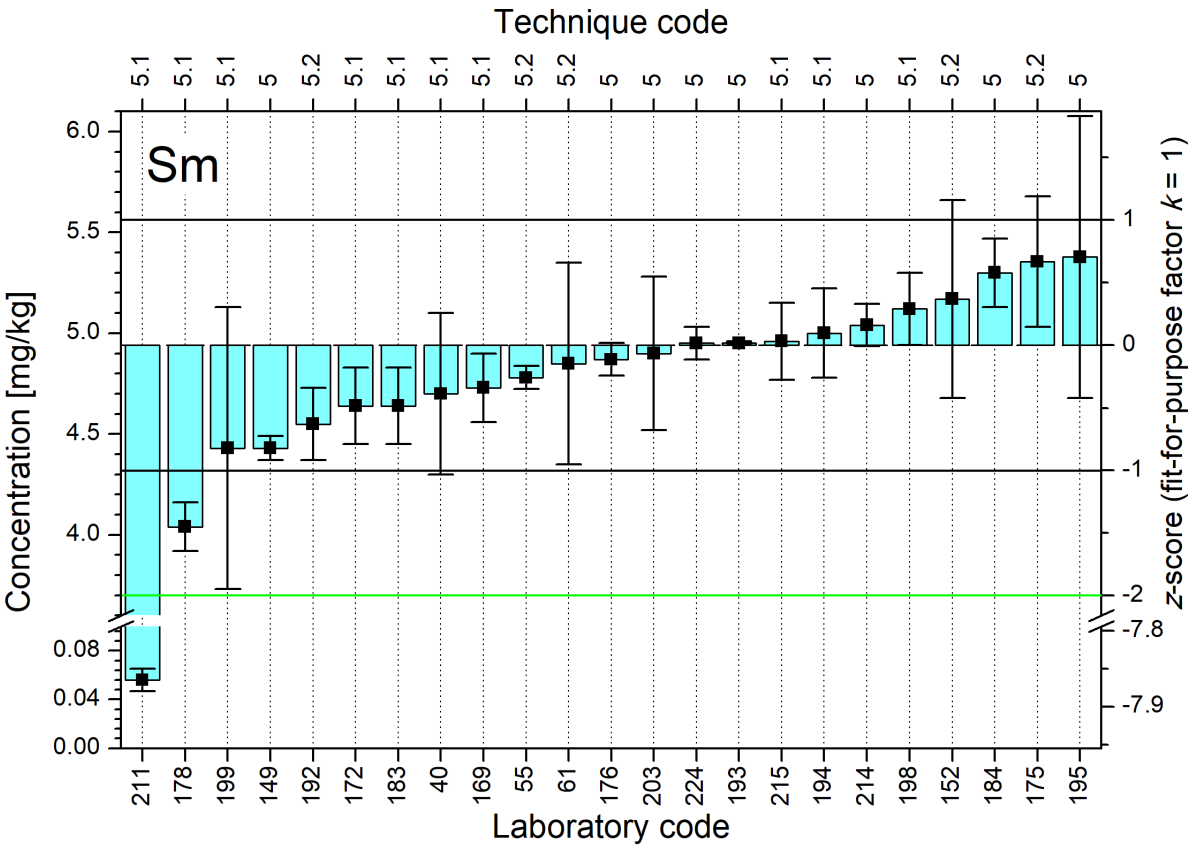

FIG. 139. Distributions of z-scores for analyte Sm (Siliceous material).

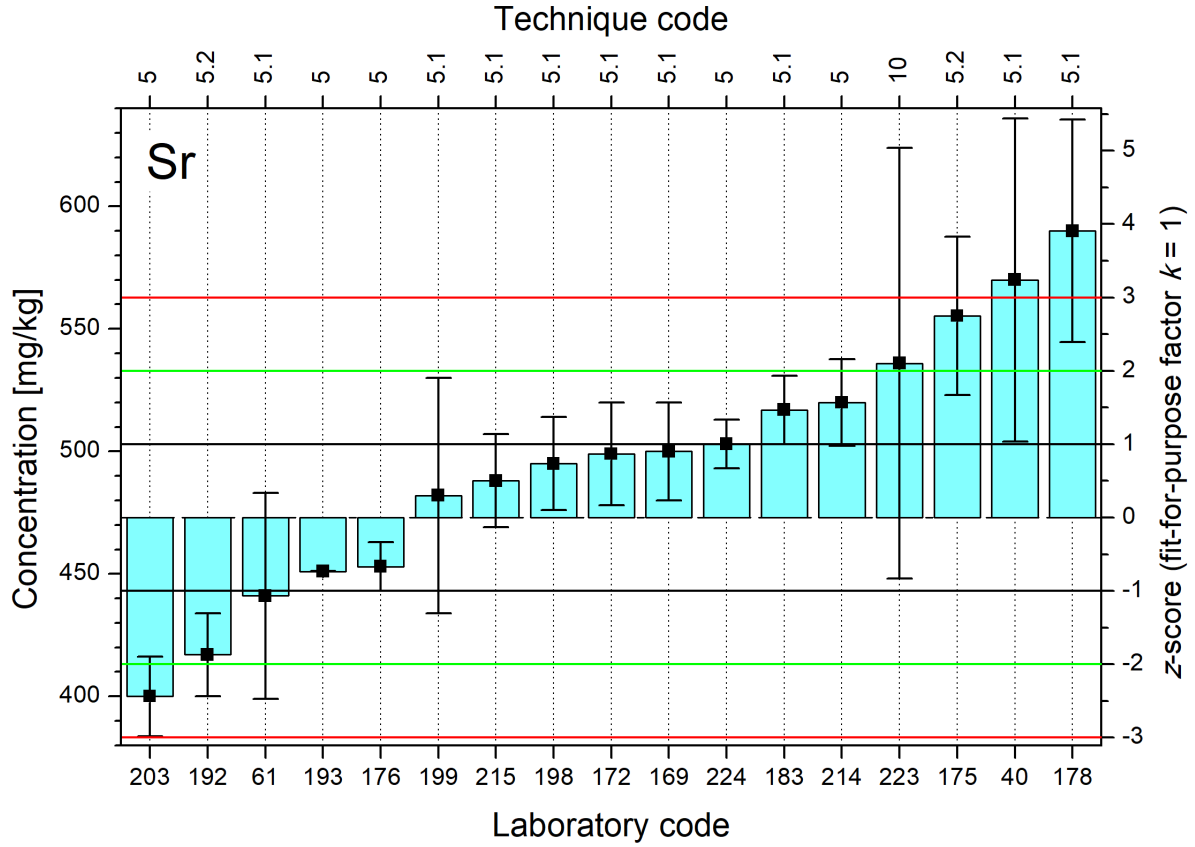

FIG. 140. Distributions of z-scores for analyte Sr (Siliceous material).

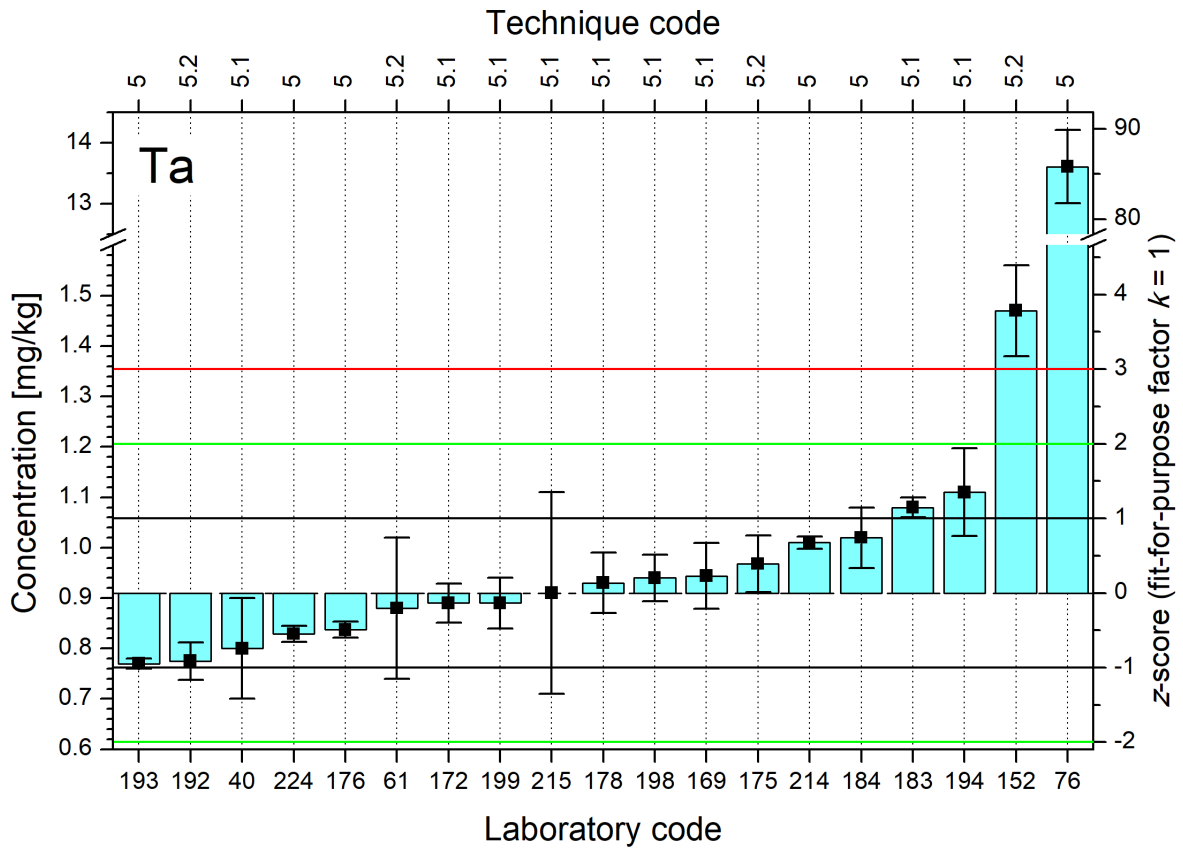

FIG. 141. Distributions of z-scores for analyte Ta (Siliceous material).

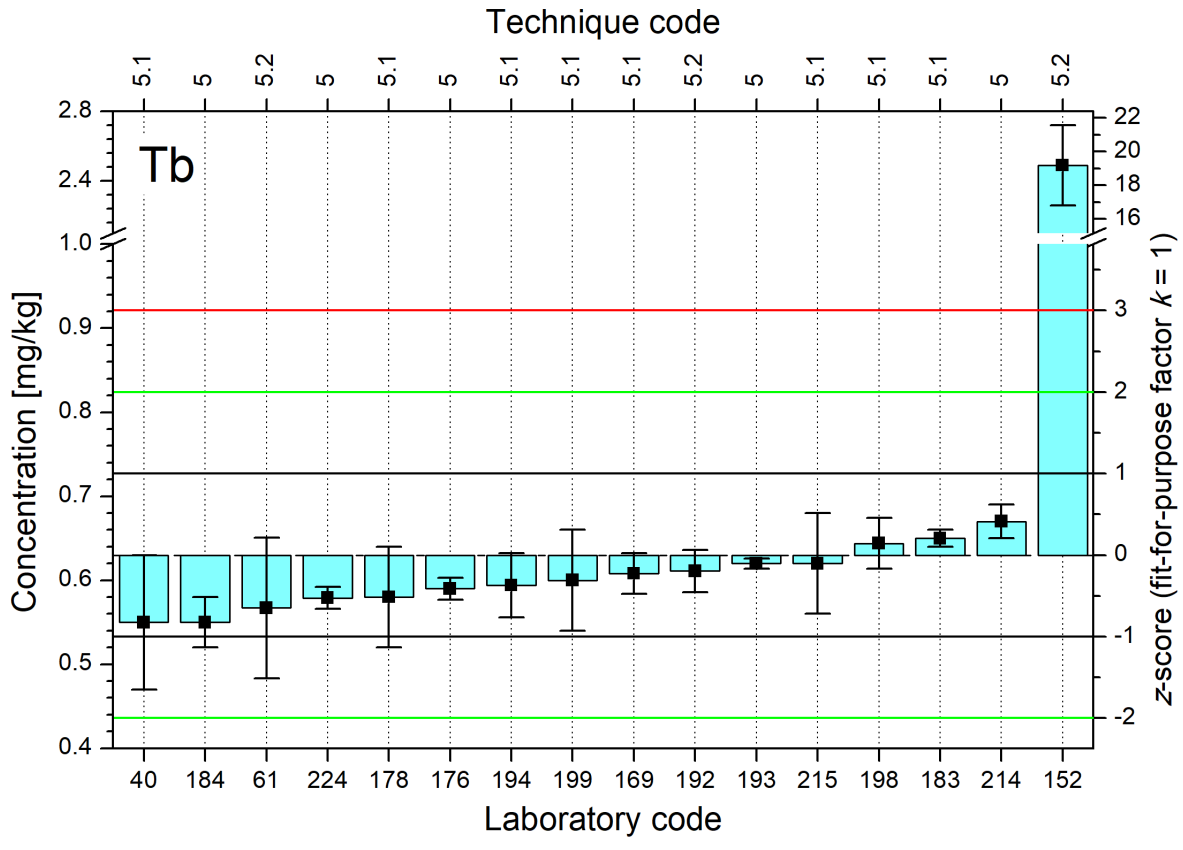

FIG. 142. Distributions of z-scores for analyte Tb (Siliceous material).

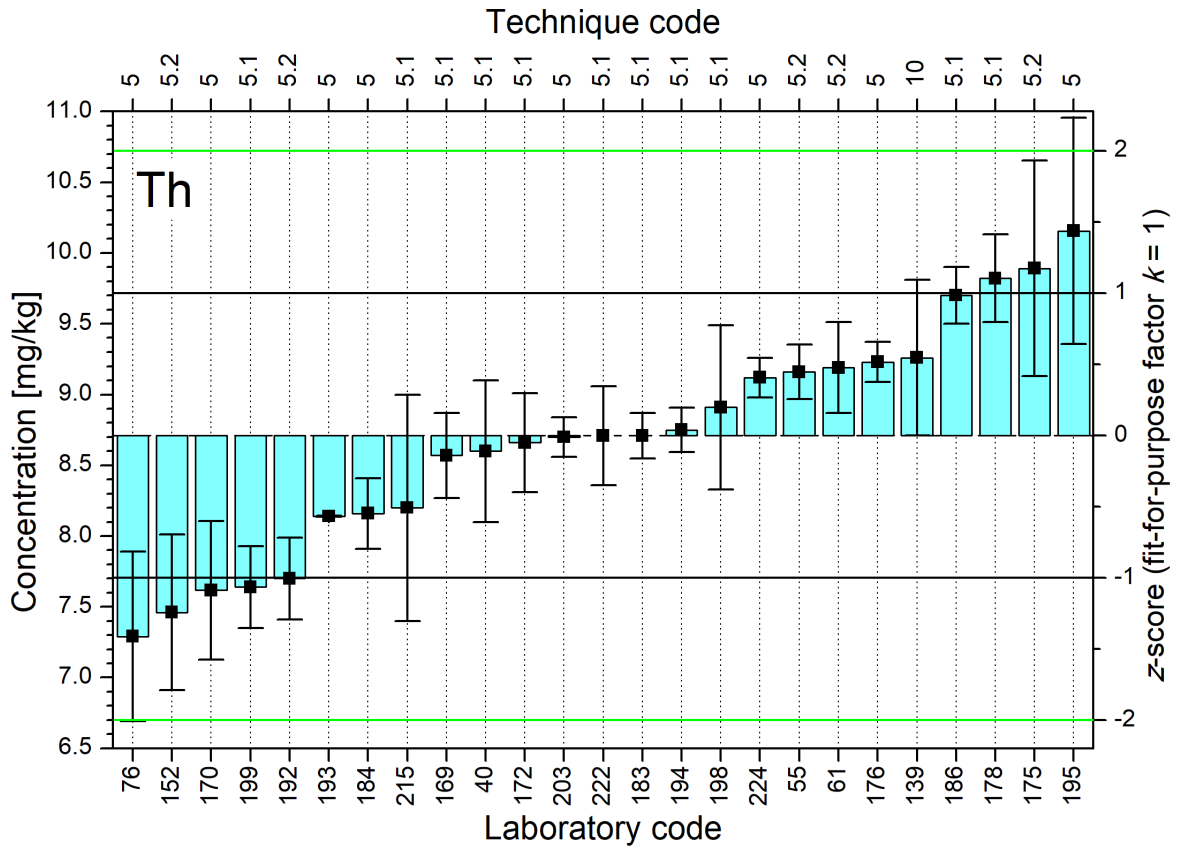

FIG. 143. Distributions of z-scores for analyte Th (Siliceous material).

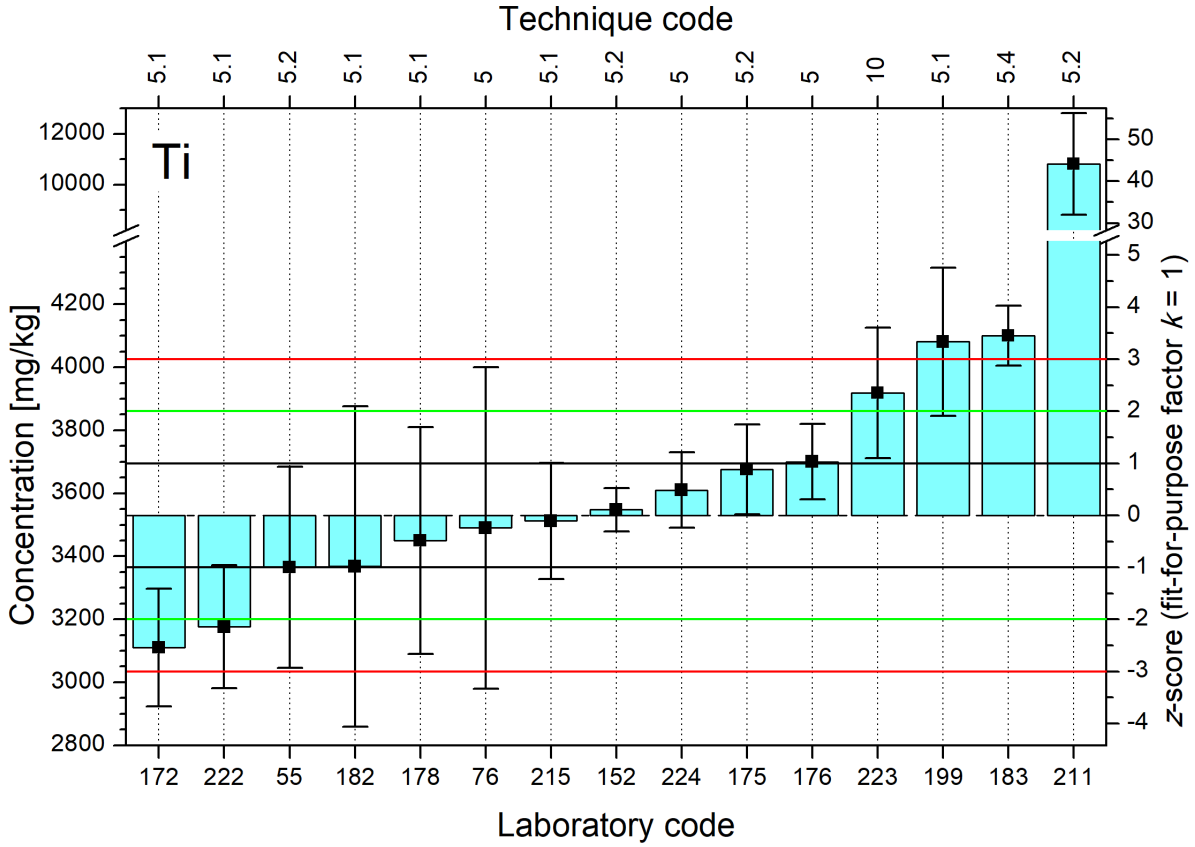

FIG. 144. Distributions of z-scores for analyte Ti (Siliceous material).

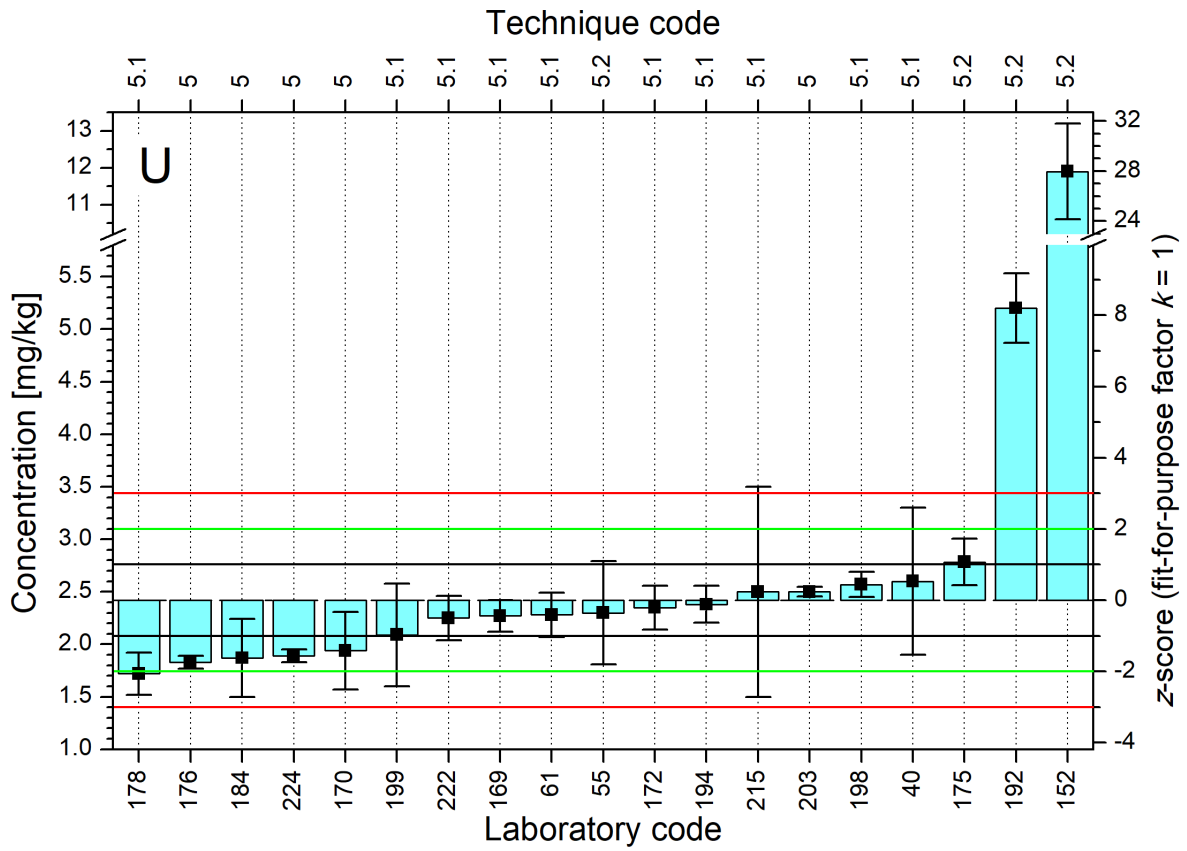

FIG. 145. Distributions of z-scores for analyte U (Siliceous material).

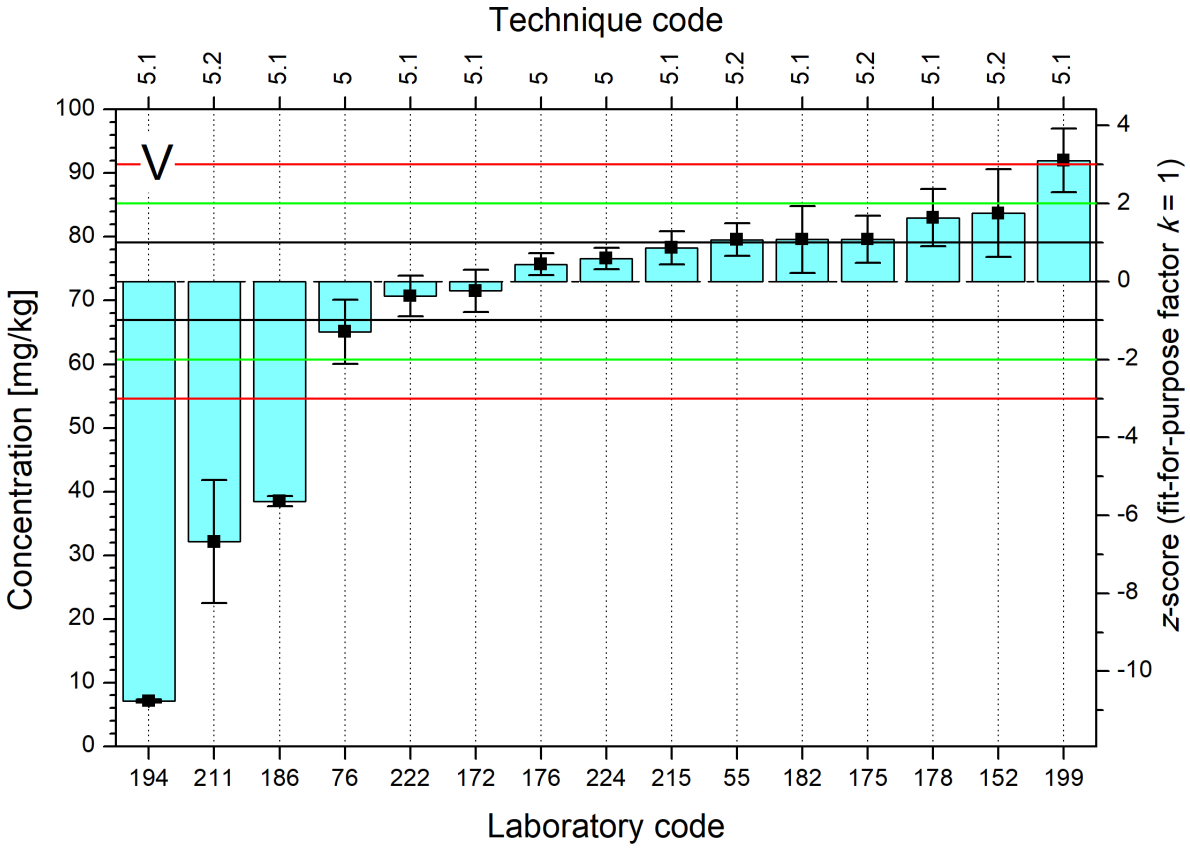

FIG. 146. Distributions of z-scores for analyte V (Siliceous material).

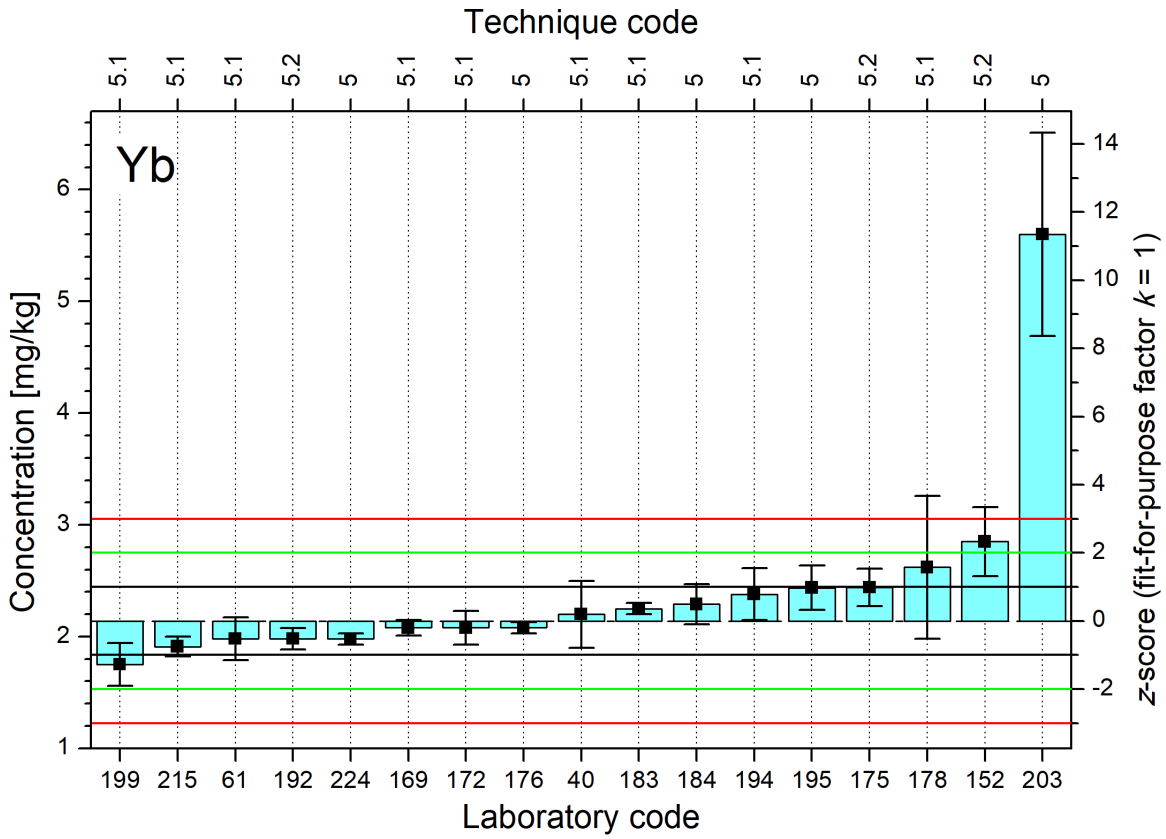

FIG. 147. Distributions of z-scores for analyte Yb (Siliceous material).

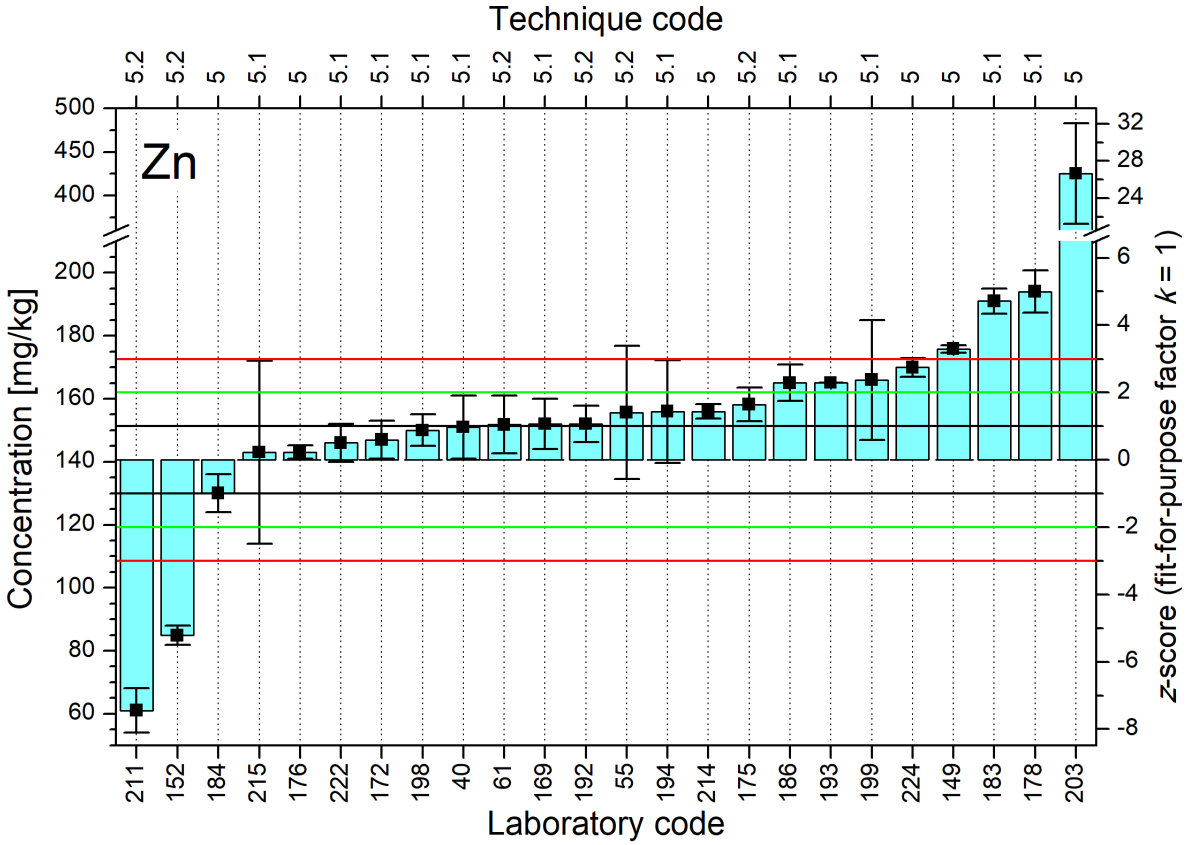

FIG. 148. Distributions of z-scores for analyte Zn (Siliceous material).

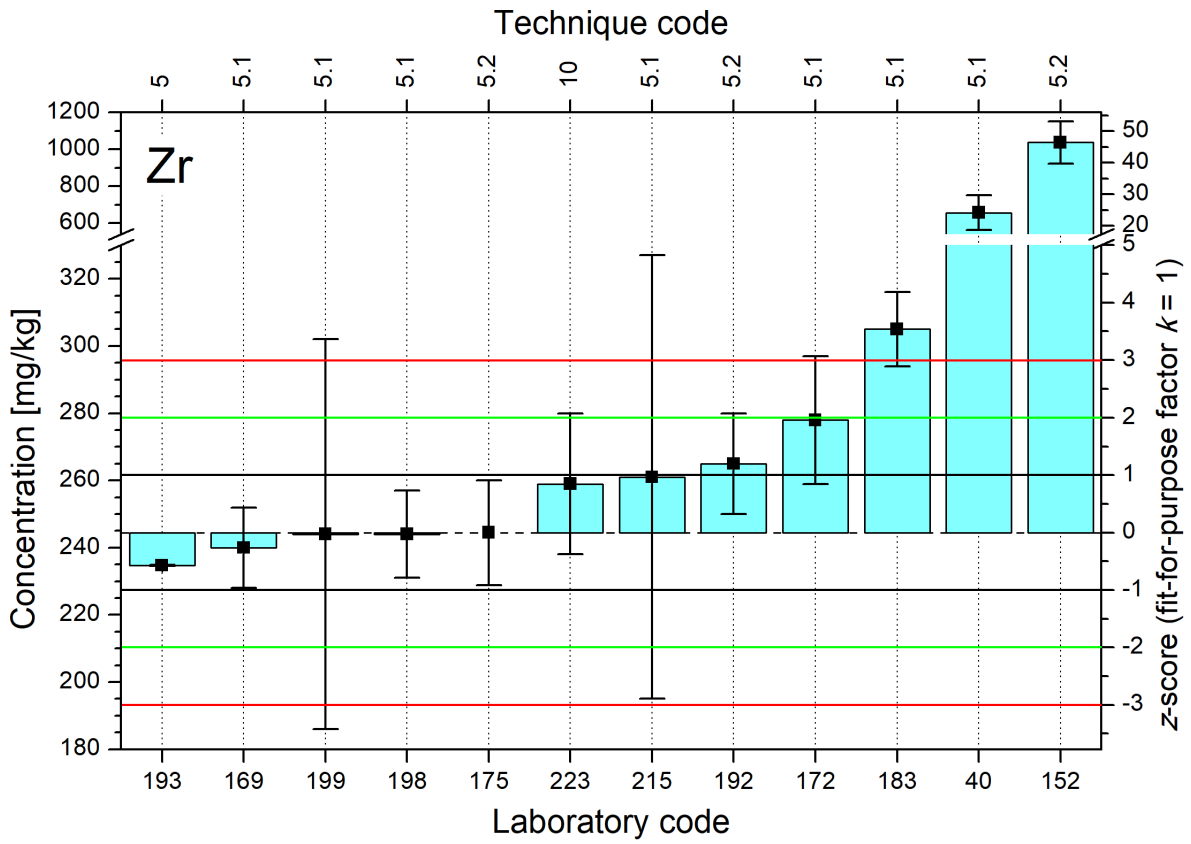

FIG. 149. Distributions of z-scores for analyte Zr (Siliceous material).

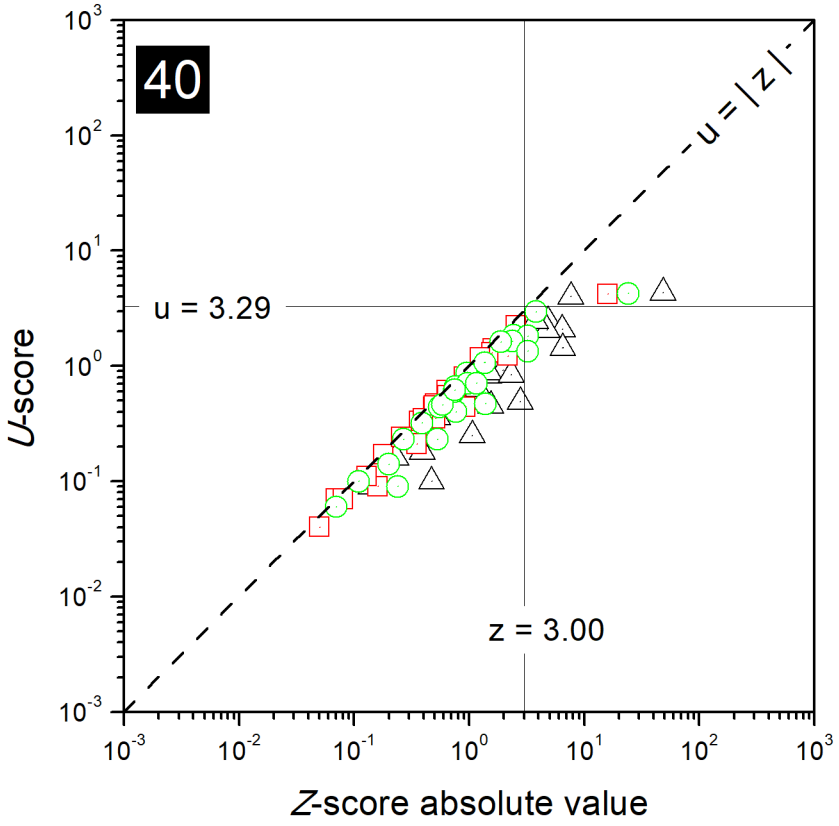

FIG. 150. Combined plots of z- and u-scores for the laboratory with code 40 (Siliceous material).

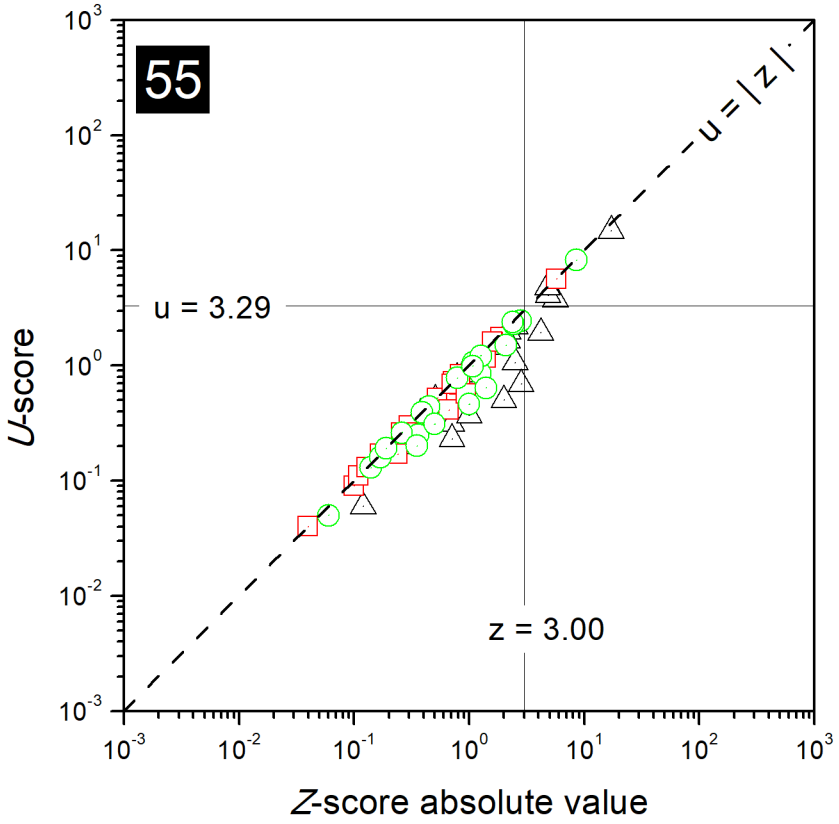

FIG. 151. Combined plots of z- and u-scores for the laboratory with code 55 (Siliceous material).

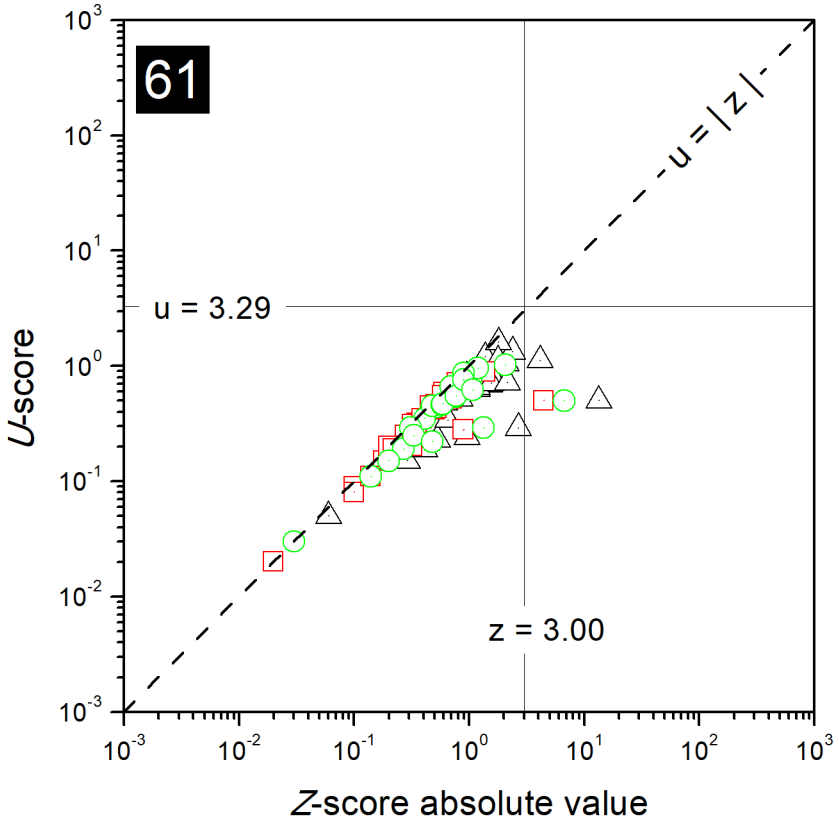

FIG. 152. Combined plots of z- and u-scores for the laboratory with code 61 (Siliceous material).

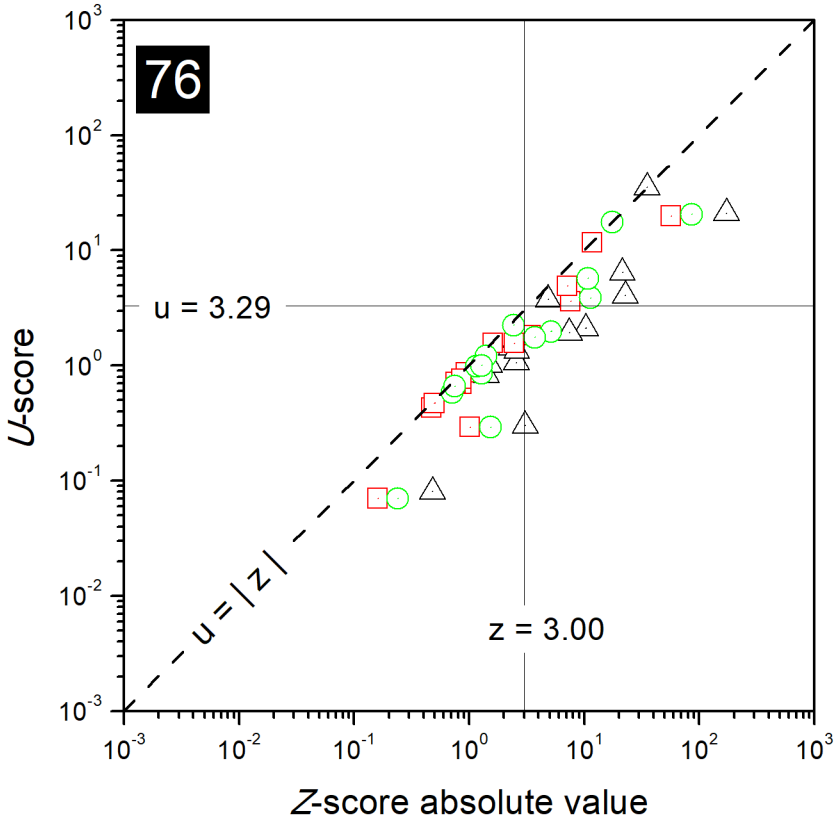

FIG. 153. Combined plots of z- and u-scores for the laboratory with code 76 (Siliceous material).

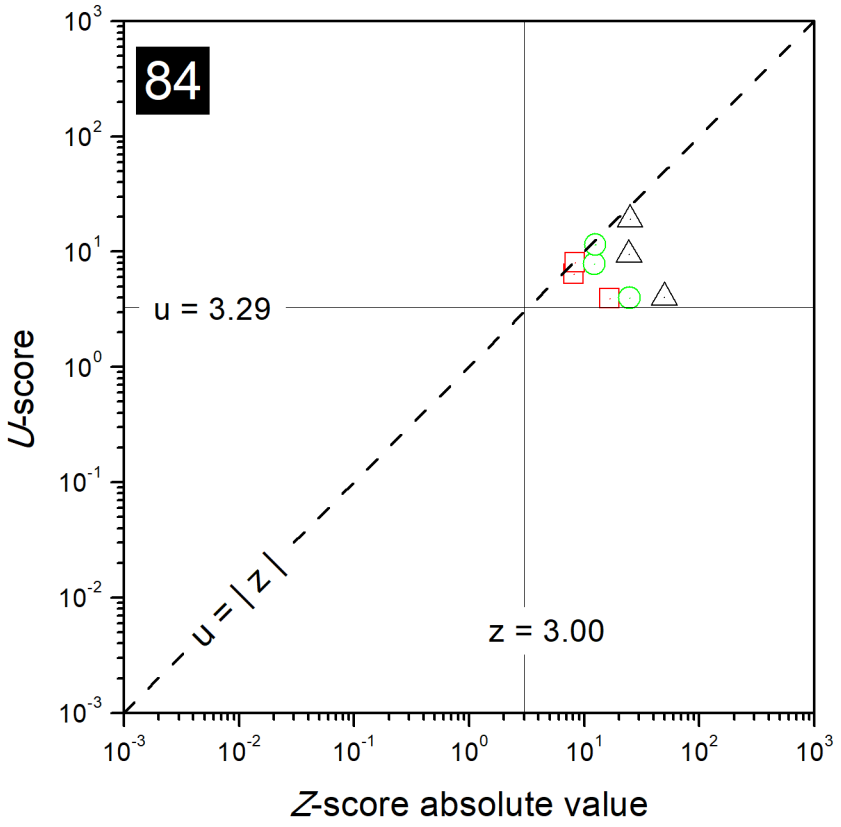

FIG. 154. Combined plots of z- and u-scores for the laboratory with code 84 (Siliceous material).

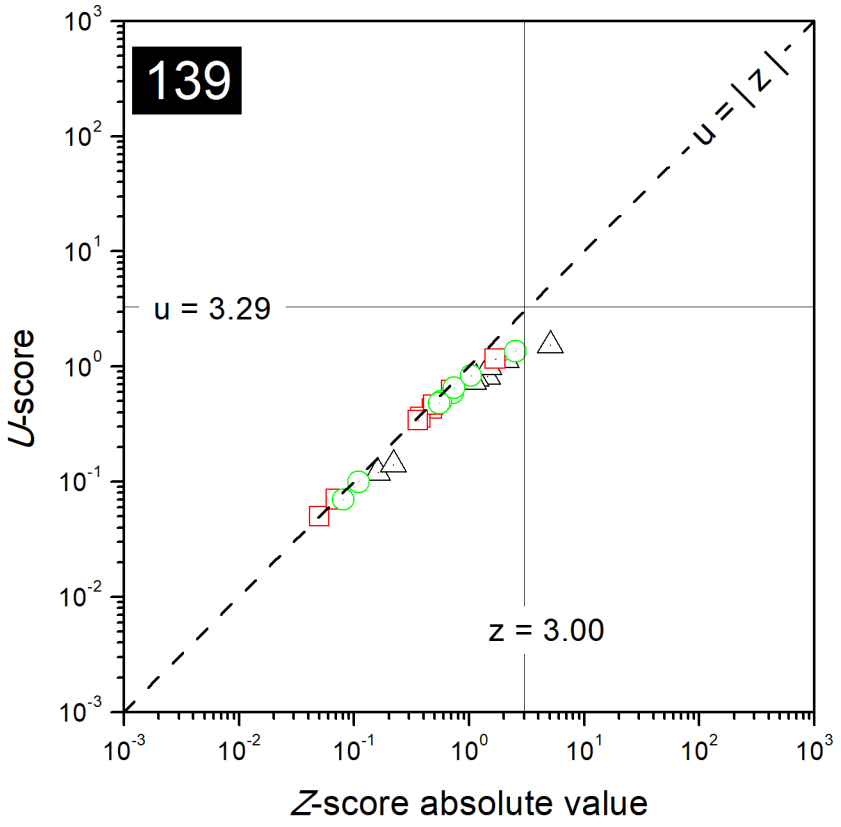

FIG. 155. Combined plots of z- and u-scores for the laboratory with code 139 (Siliceous material).

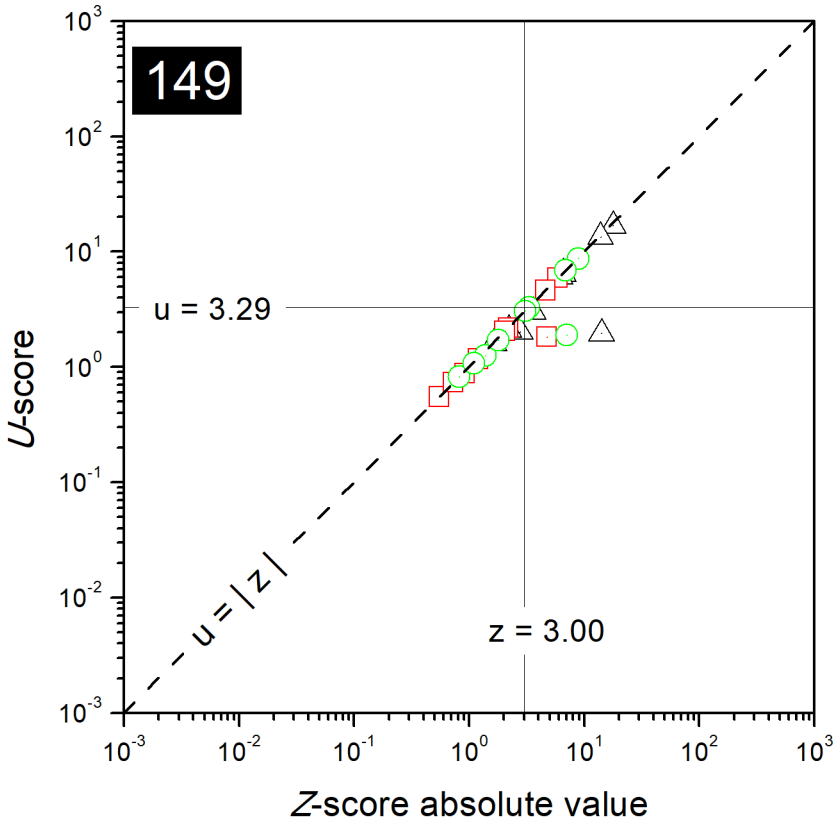

FIG. 156. Combined plots of z- and u-scores for the laboratory with code 149 (Siliceous material).

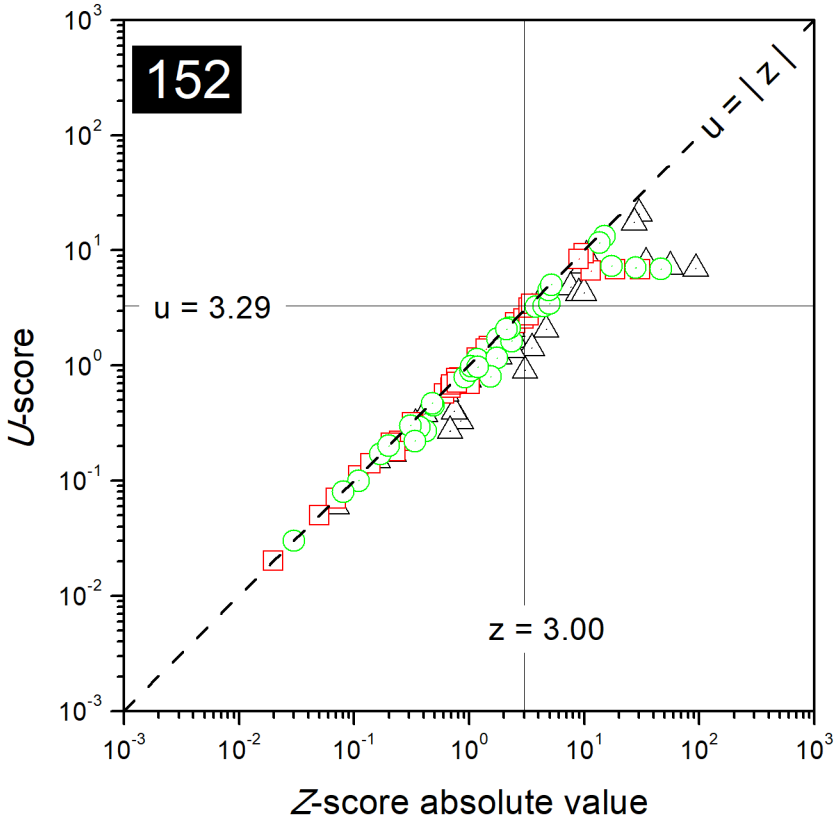

FIG. 157. Combined plots of z- and u-scores for the laboratory with code 152 (Siliceous material).

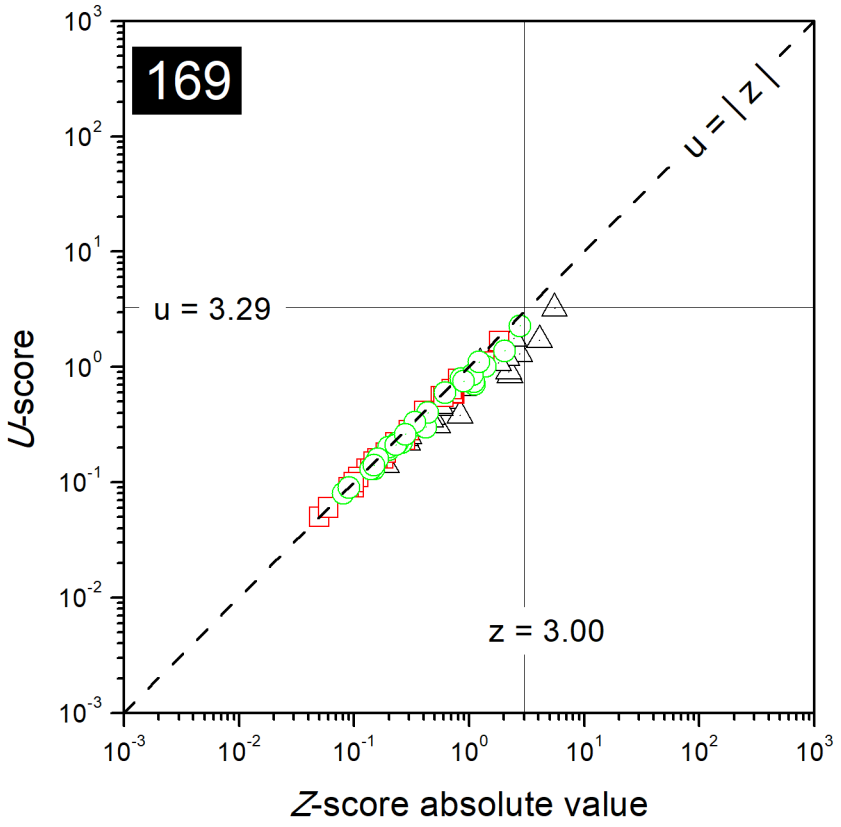

FIG. 158. Combined plots of z- and u-scores for the laboratory with code 169 (Siliceous material).

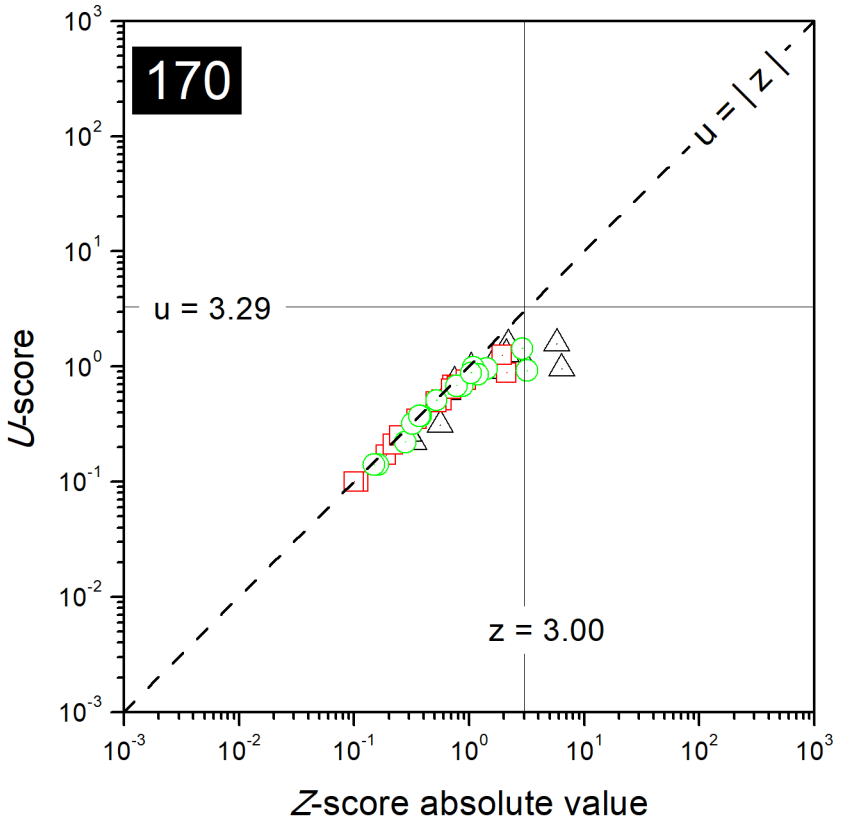

FIG. 159. Combined plots of z- and u-scores for the laboratory with code 170 (Siliceous material).

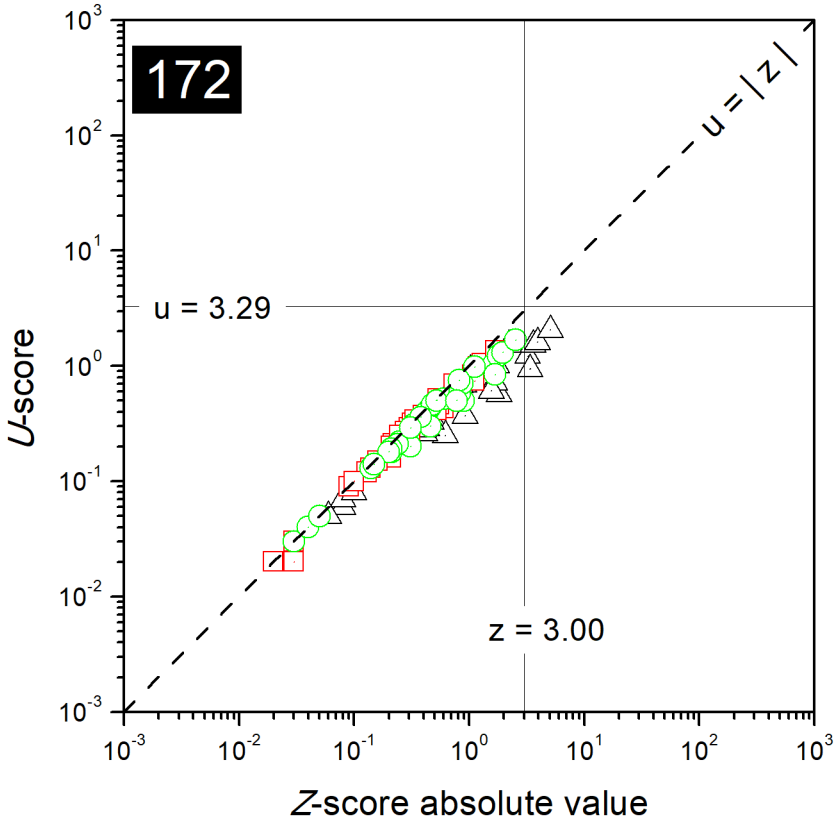

FIG. 160. Combined plots of z- and u-scores for the laboratory with code 172 (Siliceous material).

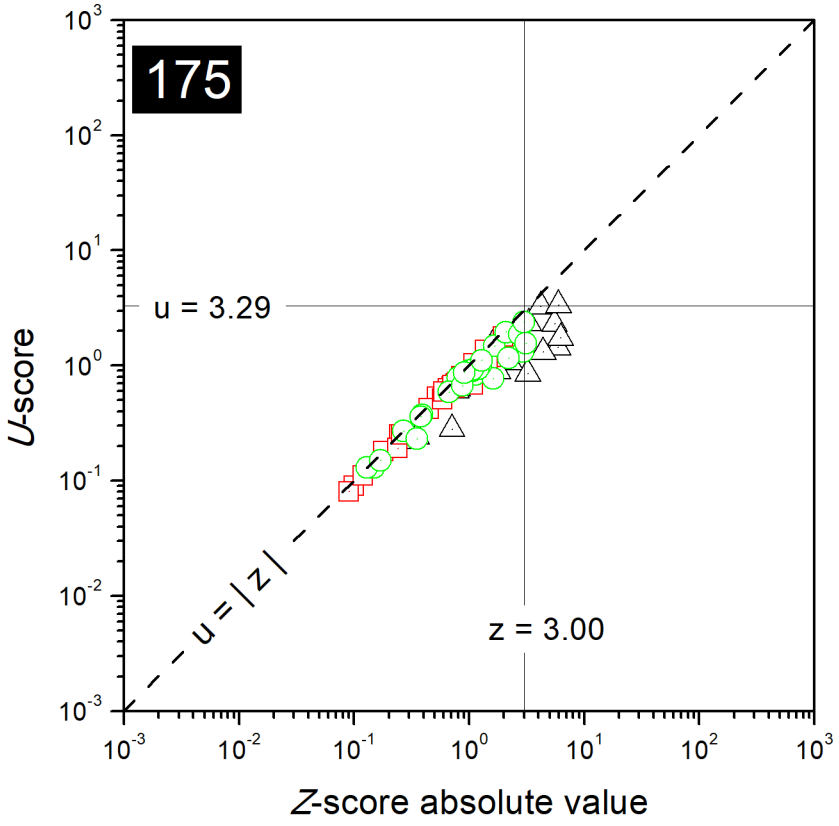

FIG. 161. Combined plots of z- and u-scores for the laboratory with code 175 (Siliceous material).

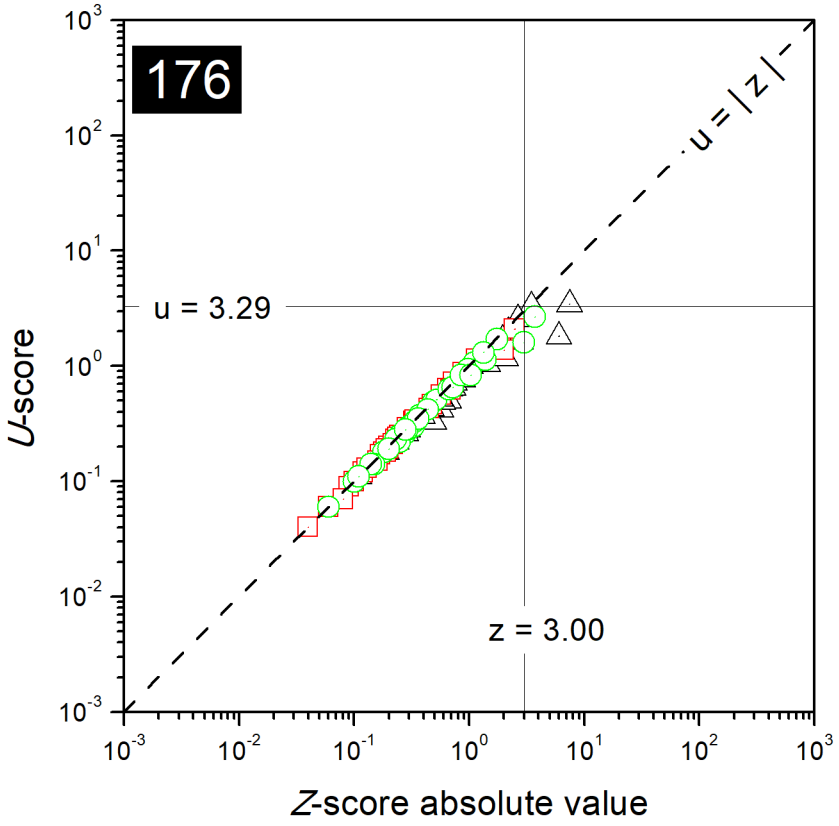

FIG. 162. Combined plots of z- and u-scores for the laboratory with code 176 (Siliceous material).

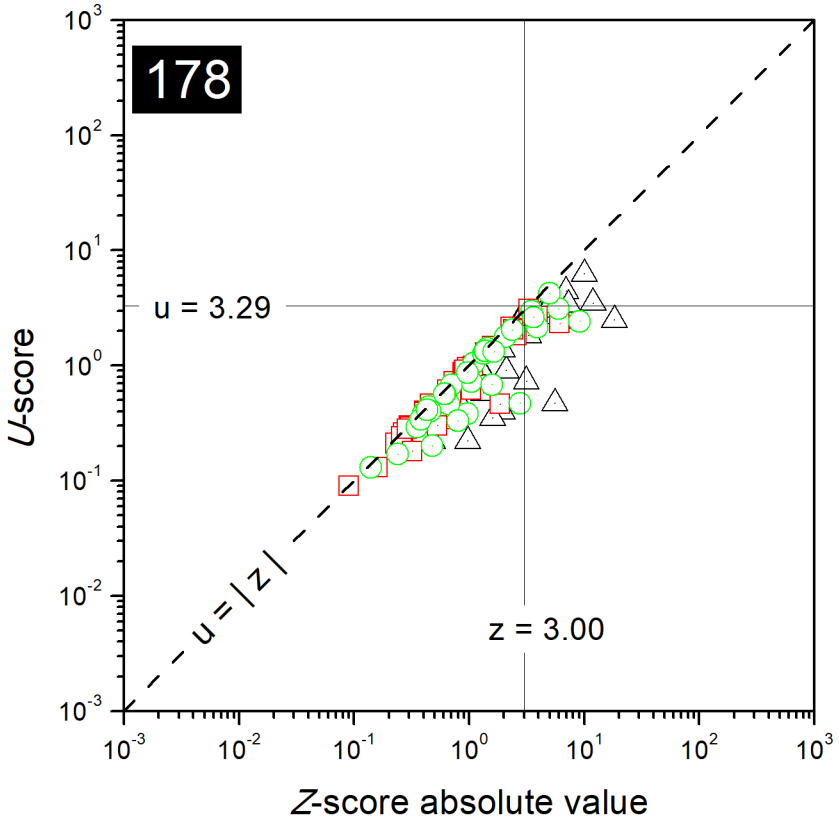

FIG. 163. Combined plots of z- and u-scores for the laboratory with code 178 (Siliceous material).

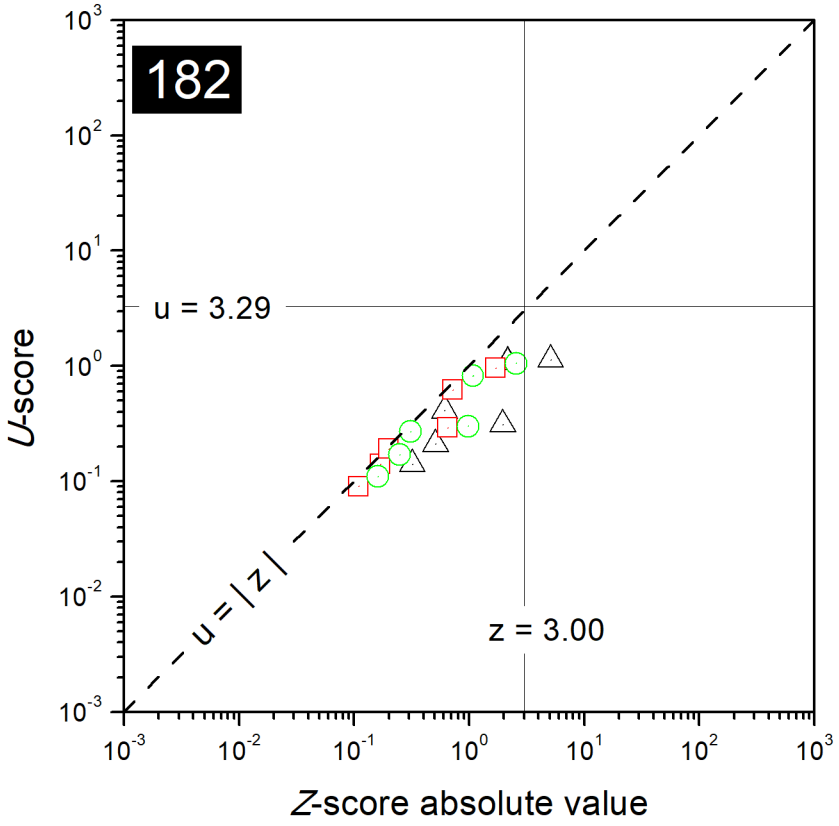

FIG. 164. Combined plots of z- and u-scores for the laboratory with code 182 (Siliceous material).

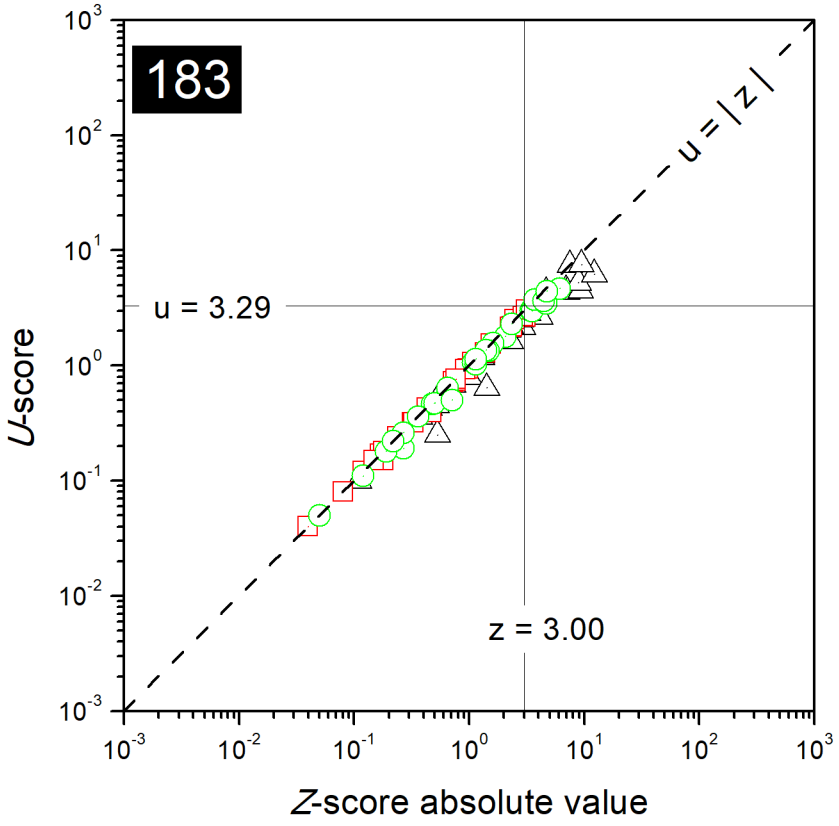

FIG. 165. Combined plots of z- and u-scores for the laboratory with code 183 (Siliceous material).

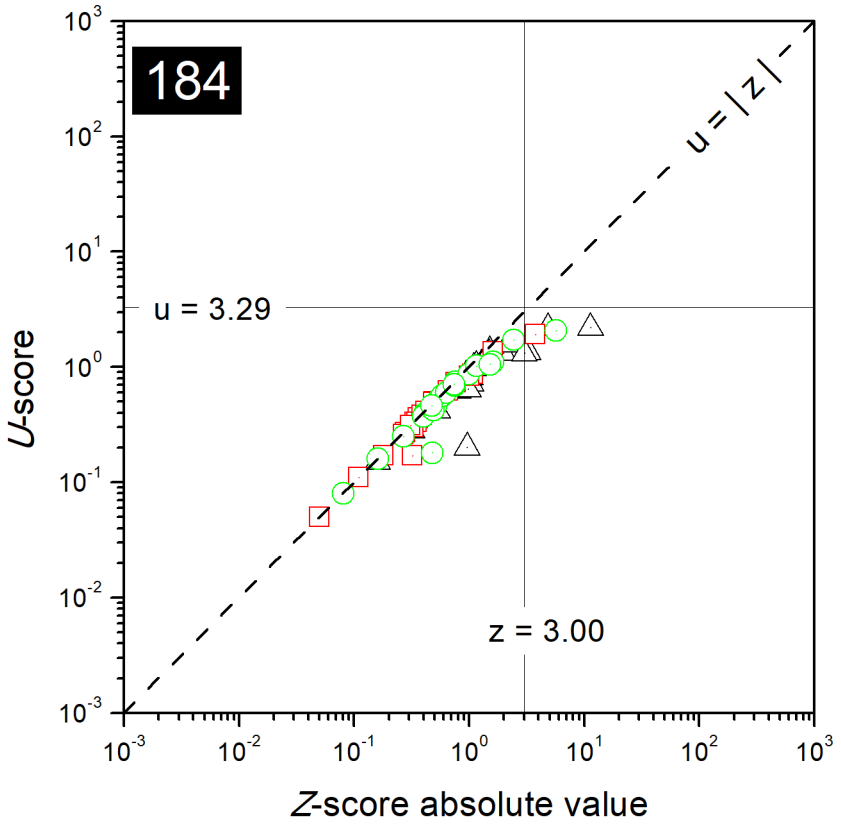

FIG. 166. Combined plots of z- and u-scores for the laboratory with code 184 (Siliceous material).

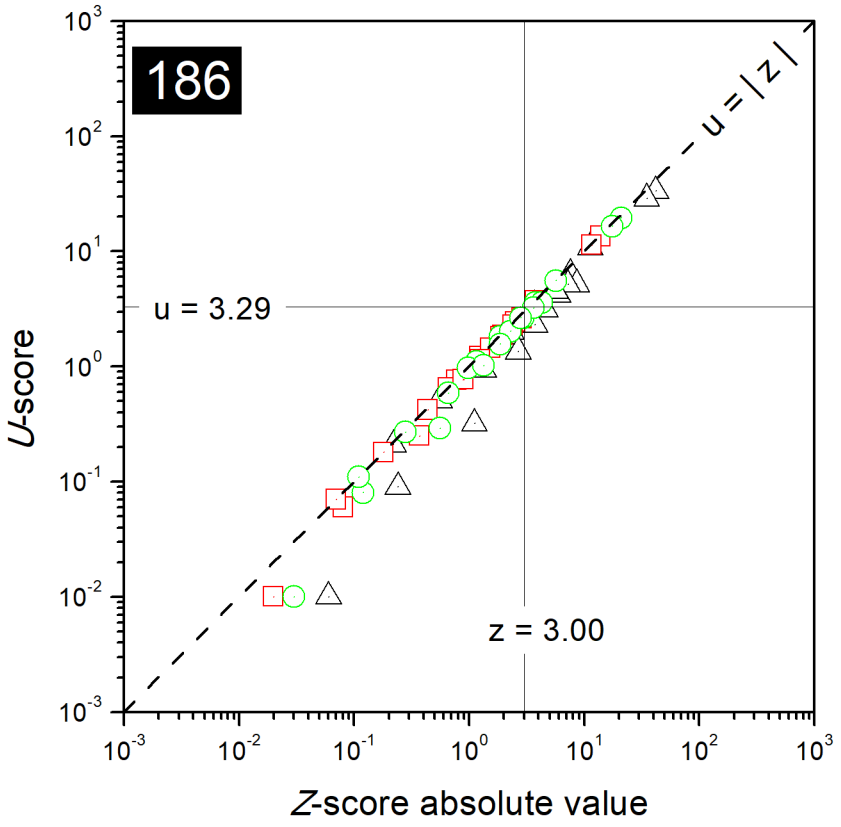

FIG. 167. Combined plots of z- and u-scores for the laboratory with code 186 (Siliceous material).

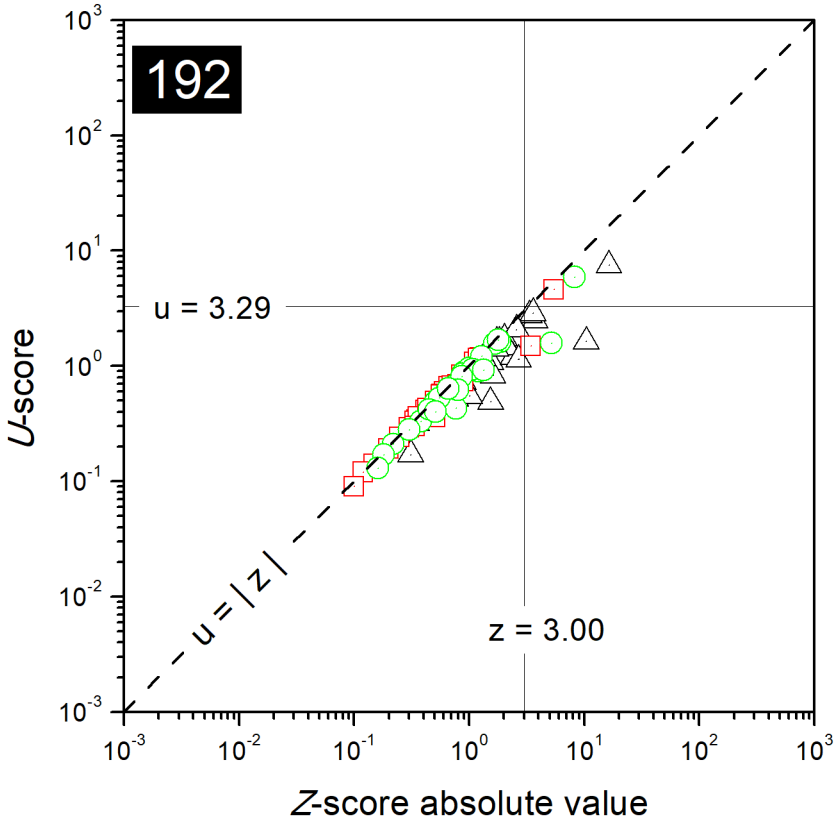

FIG. 168. Combined plots of z- and u-scores for the laboratory with code 192 (Siliceous material).

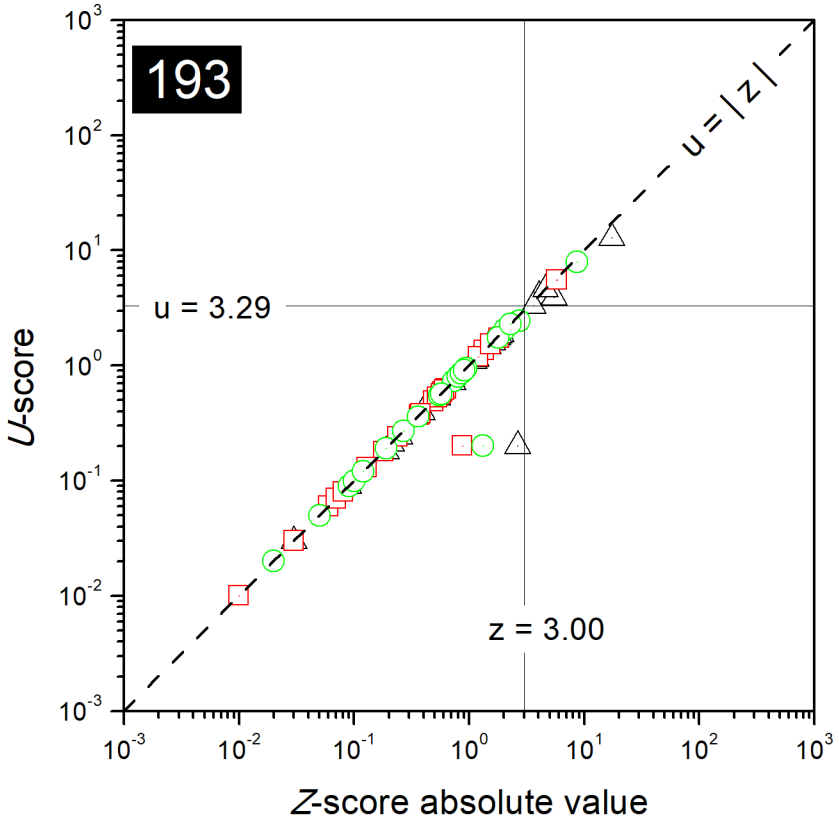

FIG. 169. Combined plots of z- and u-scores for the laboratory with code 193 (Siliceous material).

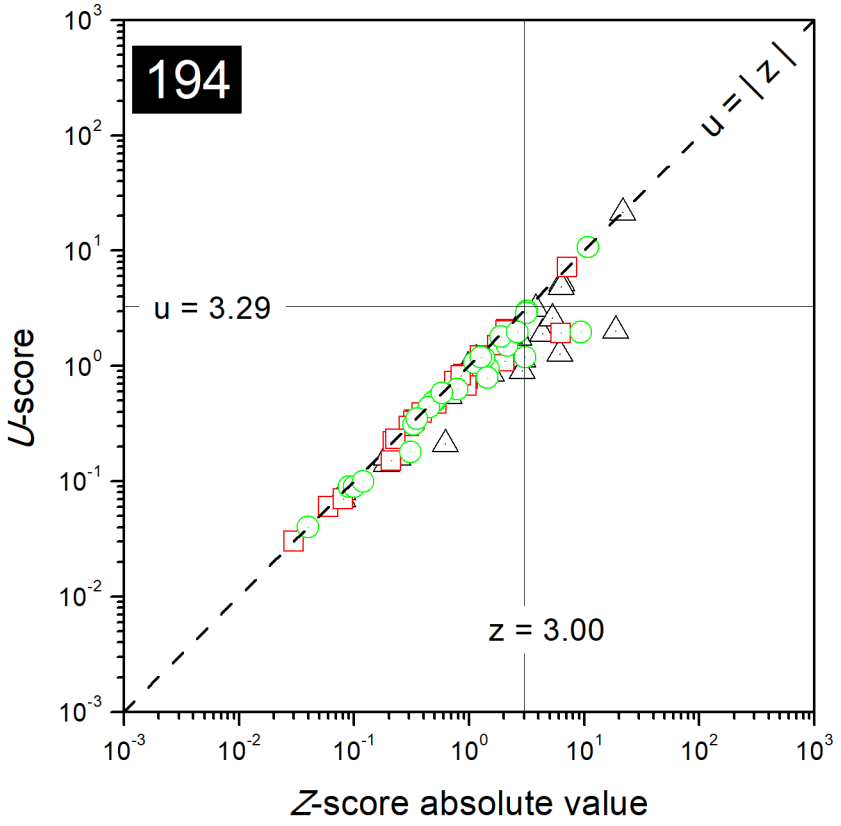

FIG. 170. Combined plots of z- and u-scores for the laboratory with code 194 (Siliceous material).

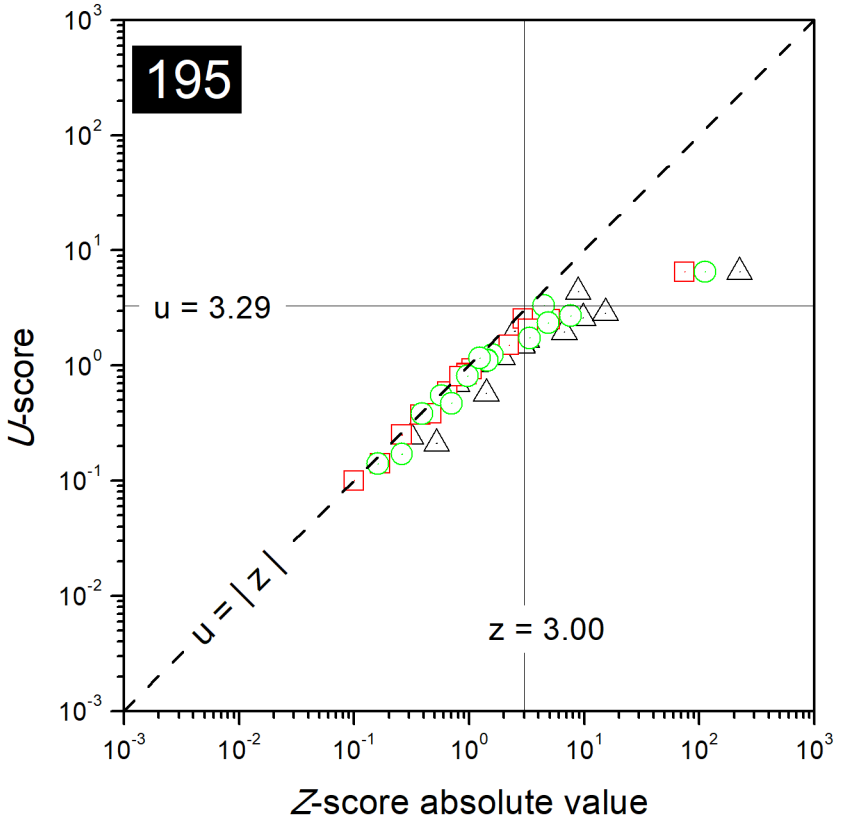

FIG. 171. Combined plots of z- and u-scores for the laboratory with code 195 (Siliceous material).

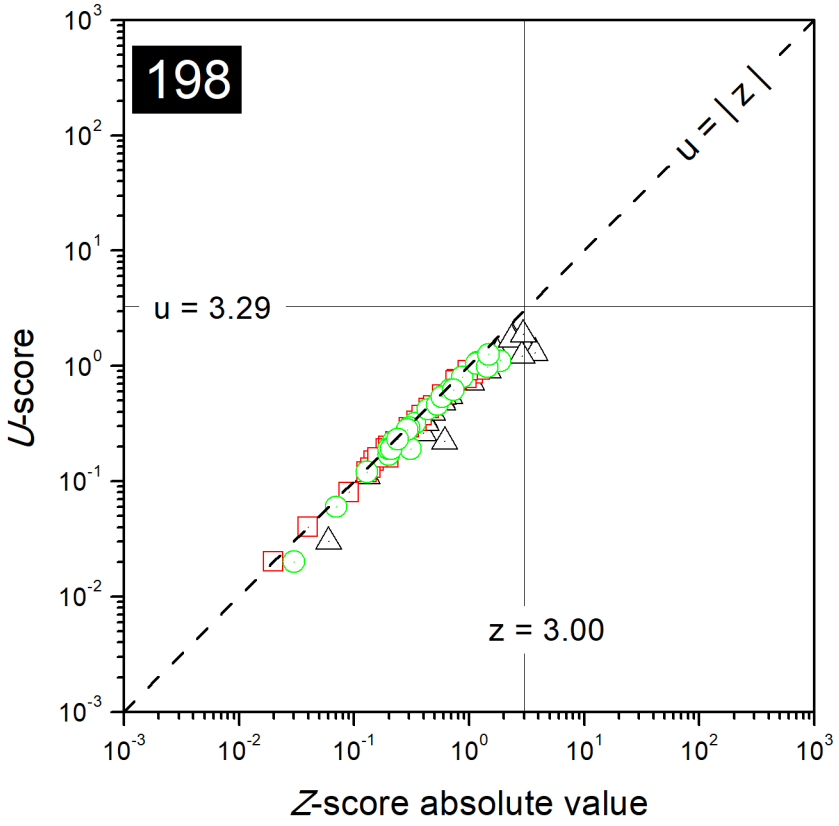

FIG. 172. Combined plots of z- and u-scores for the laboratory with code 198 (Siliceous material).

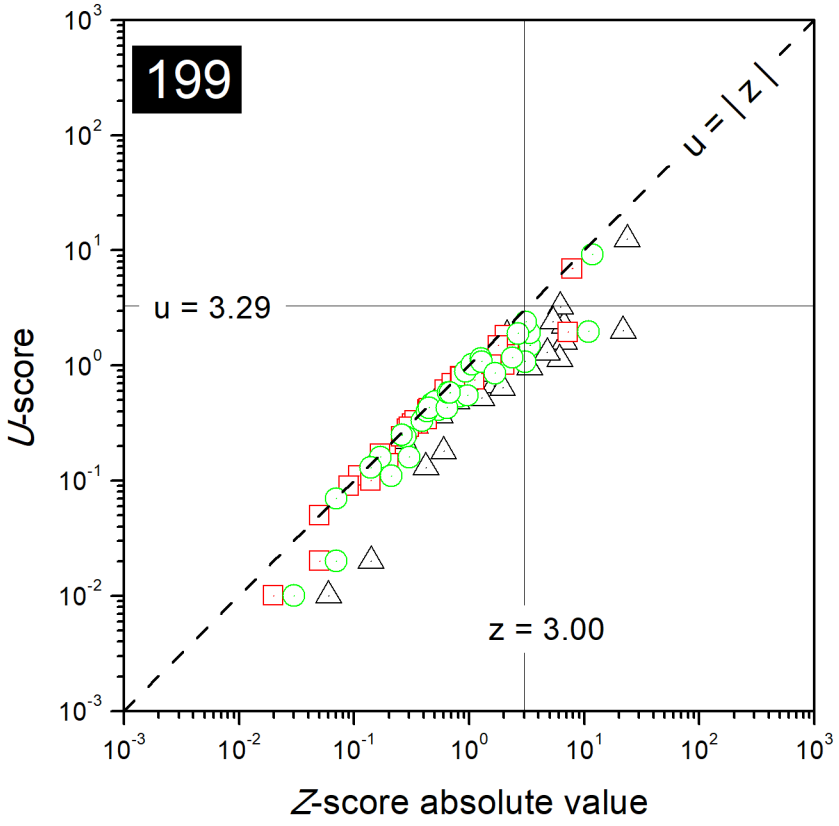

FIG. 173. Combined plots of z- and u-scores for the laboratory with code 199 (Siliceous material).

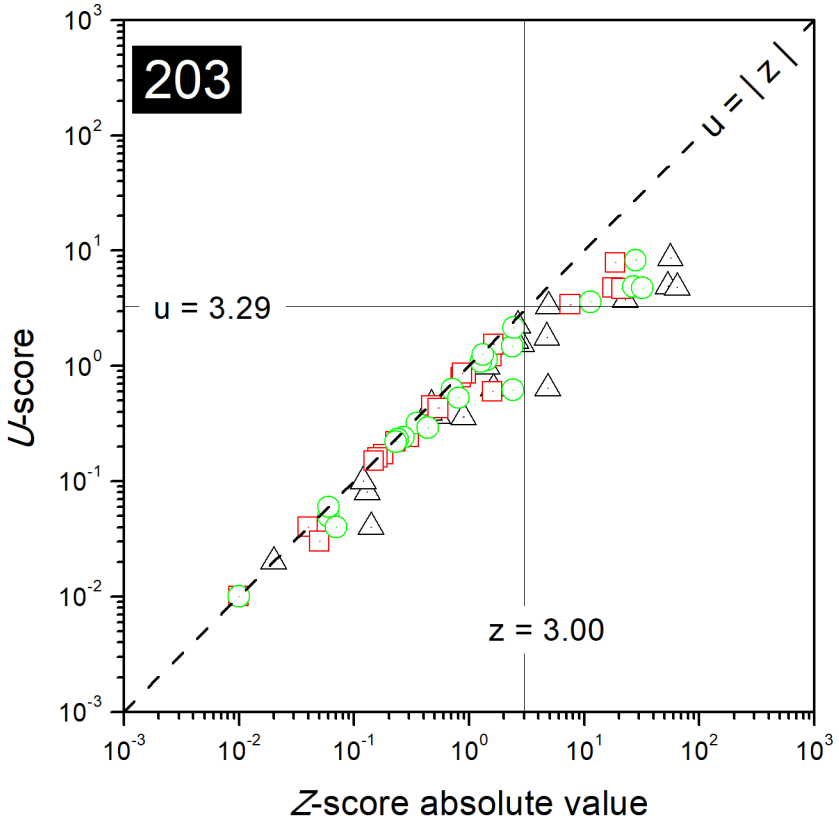

FIG. 174. Combined plots of z- and u-scores for the laboratory with code 203 (Siliceous material).

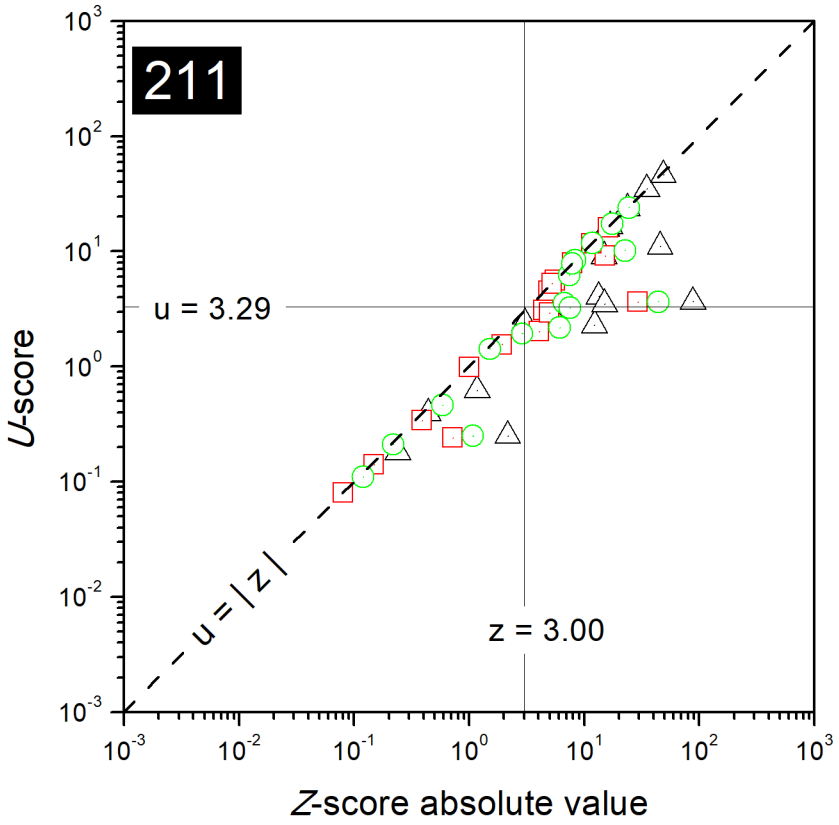

FIG. 175. Combined plots of z- and u-scores for the laboratory with code 211 (Siliceous material).

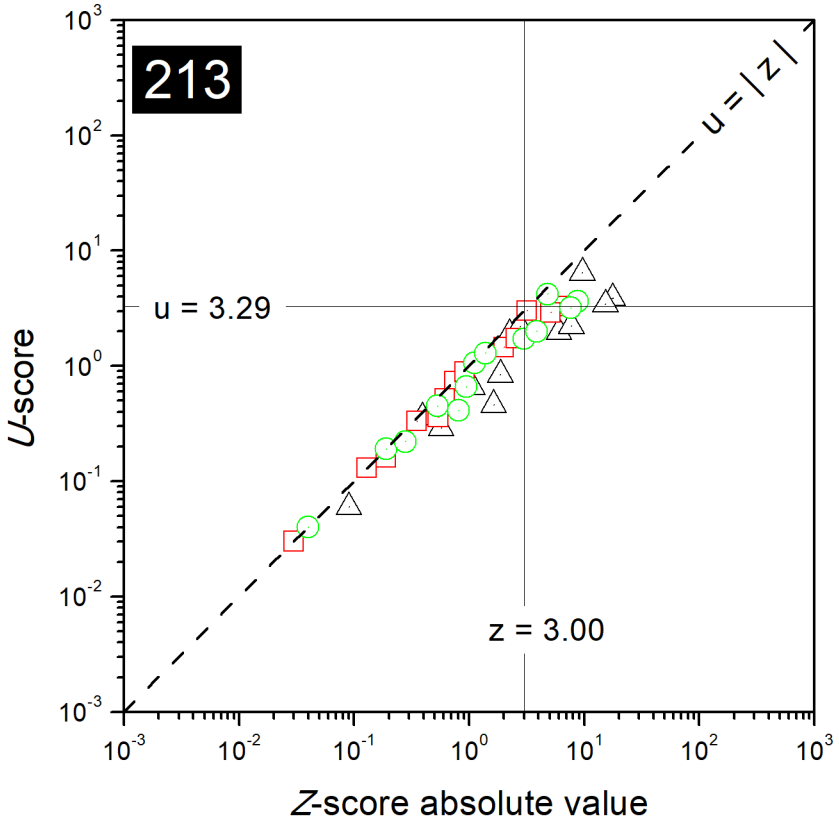

FIG. 176. Combined plots of z- and u-scores for the laboratory with code 213 (Siliceous material).

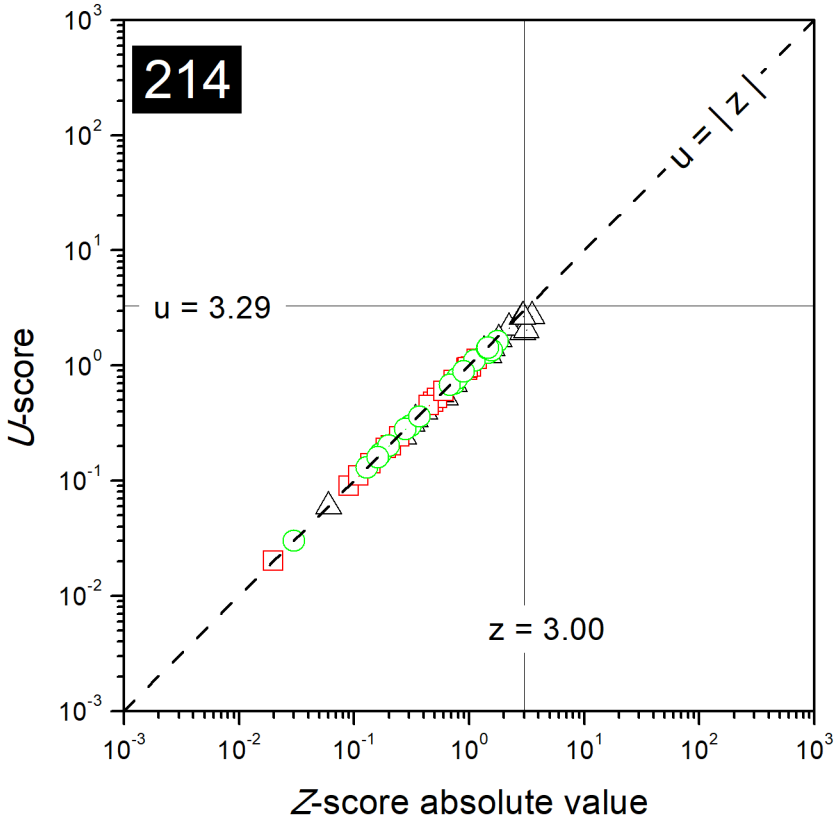

FIG. 177. Combined plots of z- and u-scores for the laboratory with code 214 (Siliceous material).

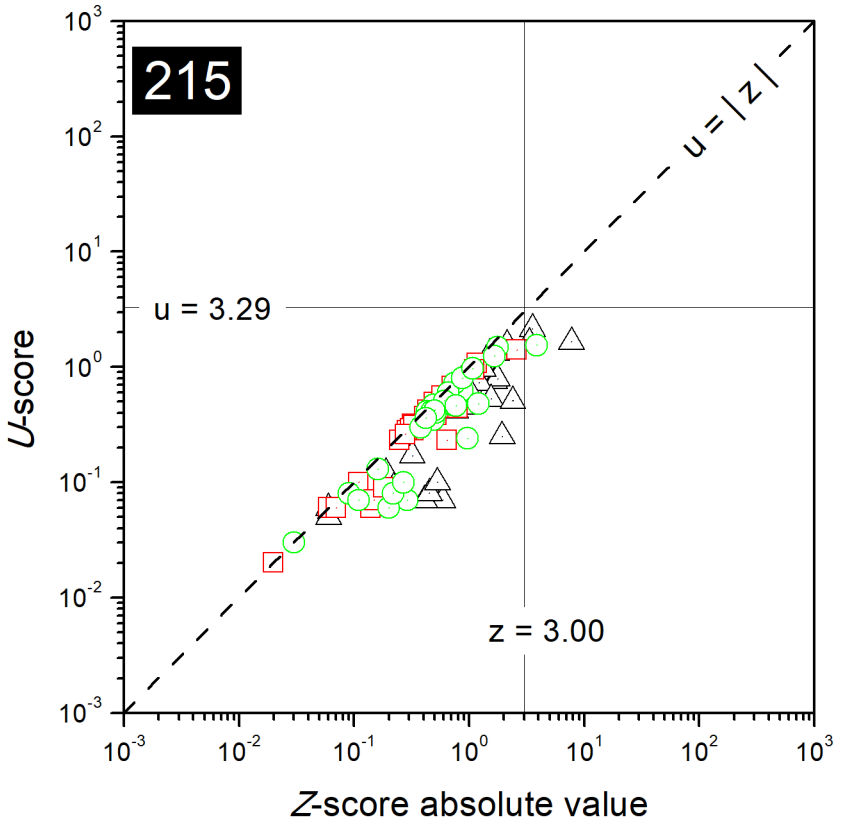

FIG. 178. Combined plots of z- and u-scores for the laboratory with code 215 (Siliceous material).

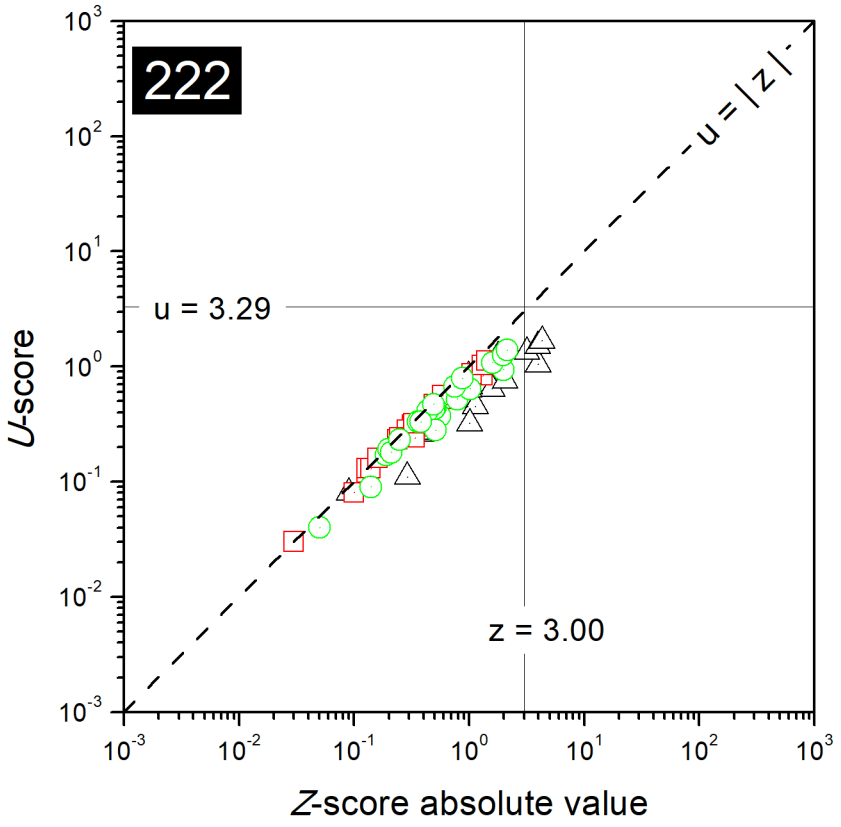

FIG. 179. Combined plots of z- and u-scores for the laboratory with code 222 (Siliceous material).

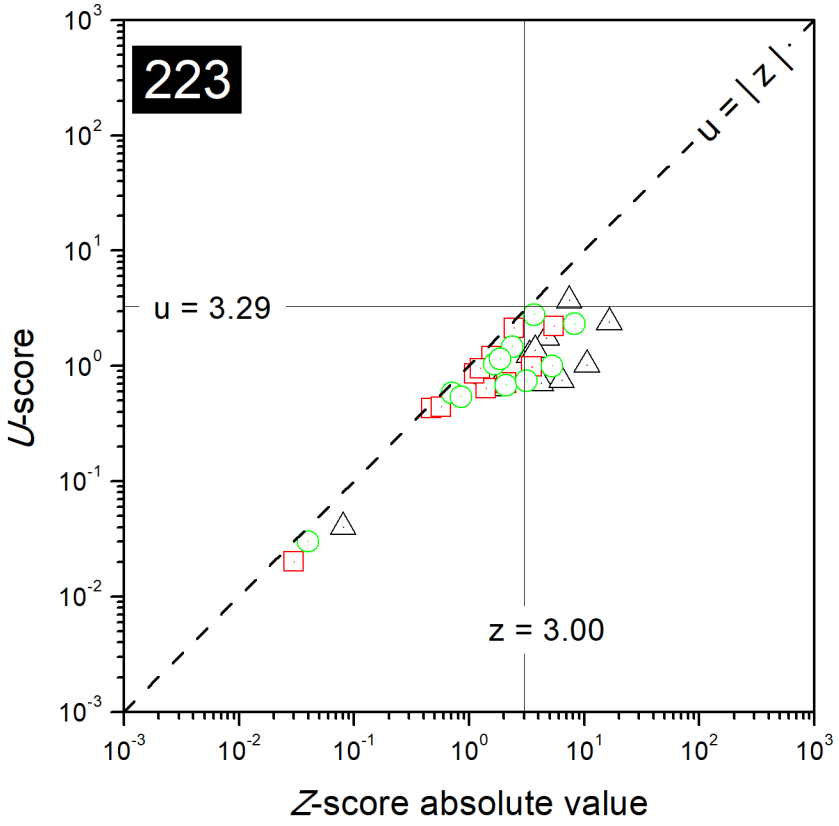

FIG. 180. Combined plots of z- and u-scores for the laboratory with code 223 (Siliceous material).

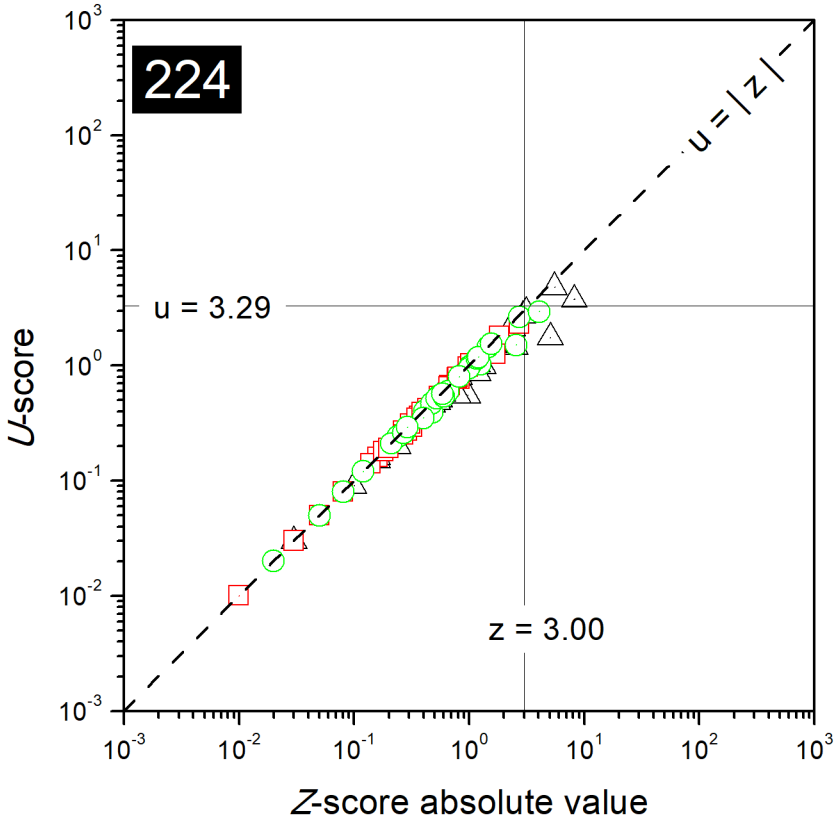

FIG. 181. Combined plots of z- and u-scores for the laboratory with code 224 (Siliceous material).

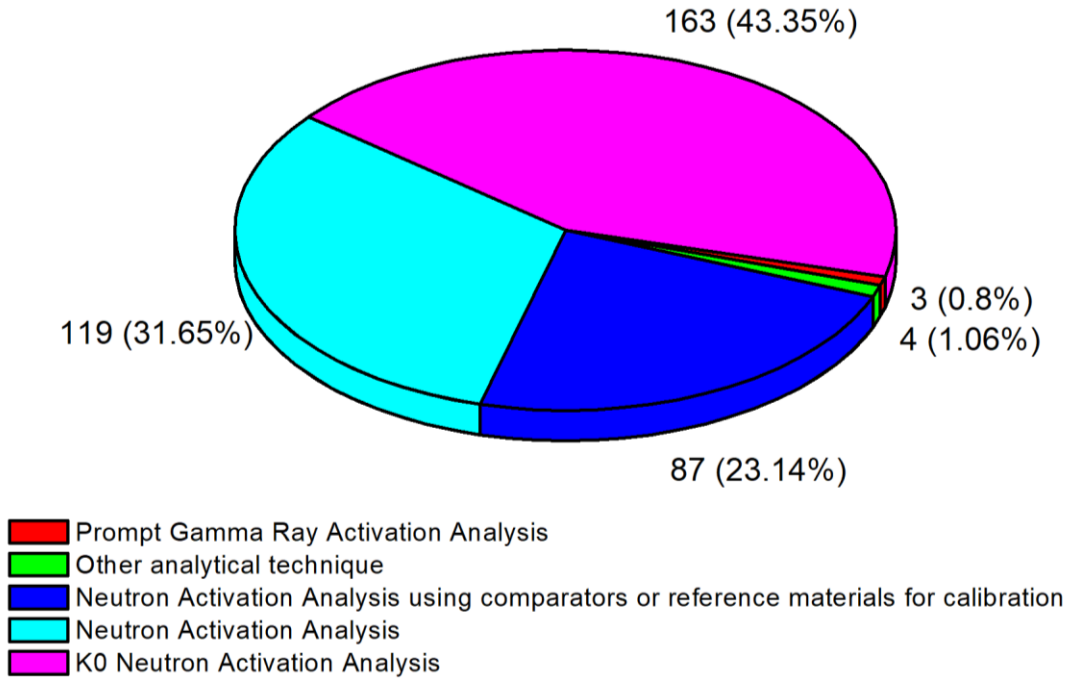

FIG. 182. The partitioning of the results between different the variations of Neutron Activation Analysis technique used by the participants for the Land-plant material. The percent values relate to the total number of 376 submitted results.

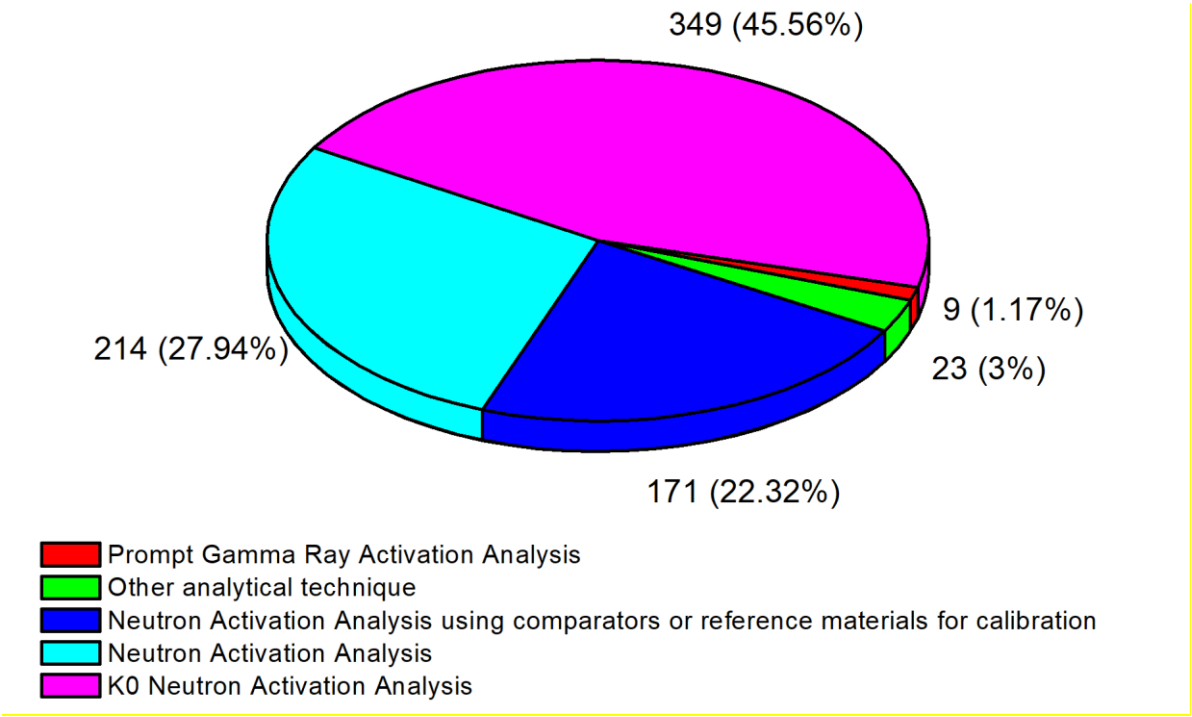

FIG. 183. The partitioning of the results between different the variations of Neutron Activation Analysis technique used by the participants for the Siliceous material. The percent values relate to the total number of 766 submitted results.

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GLOSSARY

The definitions of terms used in the proficiency testing schemes are provided. Although this terminology might be known to the participants or can be found elsewhere [8-10] the terms used in this report are clearly defined to avoid any ambiguity.

Proficiency testing: evaluation of participant performance against pre-established criteria by means of interlaboratory comparisons.

True value: the actual concentration of the analyte in the matrix.

Assigned value: the value of the concentration of the analyte in the matrix used as the true value by the proficiency testing coordinator in the statistical treatment of results (or the best available estimate).

Target value for standard deviation: a numerical value for the standard deviation of a measurement result, which has been designated as a target for measurement quality.

Consensus value: the mean value of the reported laboratory results after the removal of outliers.

Standard deviation of the consensus value: the standard deviation of the mean value of the reported laboratory results after the removal of outliers.

Certified Reference Material: A reference material, accompanied by a certificate, one or more of whose property values are certified by a procedure which establishes traceability to an accurate realization of the unit in which the property values are expressed, and for which each certified value is accompanied by an uncertainty at a stated level of confidence.

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